AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN STRATEGIC DECISION MAKING AND THE ORGANIZATIONAL STRUCTURE OF MAJOR UNITED STATES AIR FORCE LOGISTICS ORGANIZATIONS

THESIS

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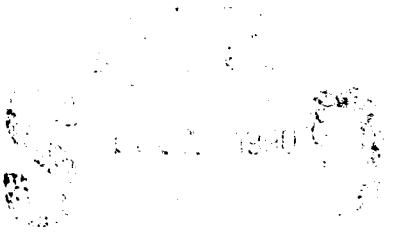

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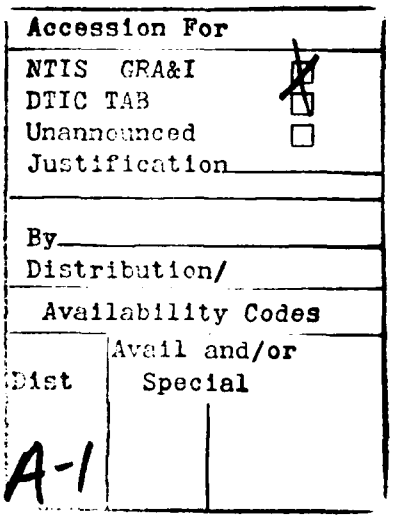

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AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN STRATEGIC DECISION MAKING AND THE ORGANIZATIONAL STRUCTURE OF MAJOR UNITED STATES AIR FORCE LOGISTICS ORGANIZATIONS

THESIS

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

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Master of Science in Systems Management

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Acknowledgments

In the words of Julius Caesar, "Veni, Vidi, Vici."

Walter A. Munyer

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Abstract

This research investigated the relationship between the organizational structure and strategic decision making process of major USAF logistics organizations. The study used the initiative to change the maintenance concept for most USAF aircraft to investigate the relationship. The research methodology was adapted from an established model drawn from the literature. Data collection was done using a mail survey. Senior Air Force logisticians were surveyed on the decision making process their organizations employed in implementing the change. The survey data was analyzed using factor analysis. The data formed into two organizational structure factors--formal integration and centralization--and two decision making factors--rationality and assertiveness. The derived factors and the original variables were tested in correlation and multiple regression analyses to decide which best capture the dynamics between structure and strategic decision making. The models that best explained the variance were used to test the hypotheses. The results indicated organizational structure and strategic decision making enjoy some interrelatedness. The structural dimensions of formalization and integration correlated with the strategic decision making attributes of rationality and assertiveness. The centralization dimension appeared to be influenced by external factors. The study showed USAF logistics organizations use liaison devices to a greater extent than did the respondents in the base model. The Air Force also had a higher degree of specialization. There is also

a tendency on the part of Air Force logistics organizations to take a proactive stance and use bargaining in its approach to decision making.

AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN STRATEGIC DECISION MAKING AND THE ORGANIZATIONAL STRUCTURE OF MAJOR UNITED STATES AIR FORCE LOGISTICS ORGANIZATIONS

I. Introduction

General Issue

To deal effectively with expected Department of Defense budget reductions, the Secretary of Defense (SECDEF) directed each of the services to conduct a management review to focus on "streamlining, consolidating, and reducing duplication while driving authority and decision making to the lowest level" (McGehee, 1989). In response to this direction, the Secretary of the Air Force (SECAF) created the Air Force Defense Management Review Executive Group. It established the Logistics Structure/Policy Panel as its forum to address logistics issues. Among the Panel taskings was to review the "two levels of maintenance concept" to ascertain its possible contributions to an Air Force initiative to reduce spending. The centralization of off-equipment repair capabilities, inherent to the two-level concept, is intended to capitalize on resultant economies of scale, and subsequent improvements in personnel, equipment, and resource utilitization.

As a consequence of this review, the Chief of Staff of the Air Force (CSAF) tasked Air Force Logistics Command (AFLC) to spearhead the replacement of the current "three levels of maintenance concept" with a "two levels of maintenance concept" for all aircraft weapon systems Air Force-wide (McGehee, 1989). In August 1989, the Air Force Directorate

of Logistics and Engineering (USAF/LE) directed the major commands' logistics organizations to study the "organizational restructuring" of the intermediate repair process (McGehee, 1989).

A weapon system's "maintenance concept" establishes the logistics requirements for the life of a weapon system. In supporting a weapon system, its impact is, "nearly in all cases, monumental" (Materna, 1988:5-5). The maintenance concept is the foundation upon which the following are planned, developed, or acquired:

1. Equipment levels of repair
2. Equipment repair times
3. Equipment testability requirements
4. Technical procedures and tooling
5. Facility requirements
6. Personnel requirements
7. Support equipment requirements
8. Training requirements and criteria

(Materna, 1988:5-5; Lloyd, 1988:8-10)

Currently fielded weapon systems were procured based on the three-level concept. Aircraft components, support equipment, and technical data are designed for use at specific levels of maintenance. The operational concept for most aircraft at a deployed location is based on the intermediate maintenance capability available on-site. Spares and packaging for peacetime operating stocks and war reserve supply kits are provisioned against the repair cycle times inherent to the three-level concept. Transportation requirements are based on the demands expected from a three-level concept.

In light of the above issues, the strategic change in aircraft maintenance concept from three levels to two levels will pose major challenges to USAF logistics organizations. According to Chandler, an organizational strategies are the bases upon which structure and processes are built (1962:14). A strategic change, thus, results in the need for an organization to adjust its structure and processes (Galbraith and Kazanjian, 1986:11). Organizational structure and strategic decision-making processes have been shown to be highly interdependent and complementary (Miller, 1987:7). A study of USAF logistics organizations in the context of this change in aircraft maintenance strategy provides an opportunity to investigate the dynamics between logistics organizational structure and strategic decision making processes.

An understanding of the attributes of both organizational structure and strategic decision making processes is required prior to beginning an investigation of their relationship. A more exhaustive analysis of these attributes is provided in Chapter Two.

Organizational Structure

Organizational structure has been defined as the organization's internal pattern of relationships, authority, and communication (Frederickson, 1986:282). It comes under the purview of management (Daft and Steers, 1986:219). Integration, formalization, centralization, and complexity are the major dimensions in which structure is described (Zaltman and others, 1973:134-146; Van de Ven, 1976:70; Frederickson, 1986:282-3).

Integration describes the extent to which liaison devices, such as task forces and committees, are used to foster collaboration among units within an organization (Lawrence and Lorsch, 1967:11; Mintzberg, 1979:178).

Formalization specifies the extent to which an organization uses rules and procedures to prescribe behavior. It specifies how, where, and by whom tasks are to be performed (Frederickson, 1986:283). Formal documentation includes written rules and procedures, job descriptions, regulations, and policy manuals (Daft and Steers, 1986:219).

Centralization refers to the degree to which decision-making and evaluating activities are concentrated. The higher the level in the organization decisions are made and the less participation that exists in decision-making, the greater the centralization (Zaltman and other, 1973:161).

Complexity refers to the condition of being composed of many, usually interrelated parts. Regarding organizational structure, there are three potential sources of complexity--horizontal and vertical differentiation, and spatial dispersion (Hall, 1982:78-83). Complexity is reflected in the breadth of the spans of control, the number of levels, and the number of operating sites that an organization possesses.

Strategic Decision Making

Strategic decision-making has been considered along three dimensions: rationality, interaction, and assertiveness.

Rationality is central to two schools of thought. The first school suggests that rationality is the process by which an organization

defines a problem, defines expectations, develops alternative solutions, and provides a course of action after a decision is reached (Simon, 1976:60). During the strategic decision-making process, an organization engages in careful analysis by systematically scanning markets for problems and opportunities and methodically planning and articulating unified strategies (Miller, 1987:8). In contrast, the second school contends that during the strategic decision-making process, an organization is subject to bounded rationality where people have limits as to how rational they can be. Instead, decision makers do little analysis, emphasize satisficing, and formulate strategy according to a disjointed process (Simon, 1987:13-16).

Interaction describes the strategic decision-making process in terms of the organization's political and social processes (Miller, 1987:8). Although political processes may vary greatly in nature and intensity, most organizations are political bodies in which bargaining, politicking, and consensus-building often come to bear on decisions.

Assertiveness is the willingness of an organization to consider and implement ideas, formulas, or programs that the individuals involved perceive as new (Zaltman and others, 1973:7). An organization "asserts" itself when a given program of activity no longer satisfies performance criteria and a new direction is required (March and Simon, 1958:172). Assertiveness is most prevalent in uncertain environments rather than stable environments (Mintzberg, 1979:270-272). Assertiveness is measured in terms of the levels of risk taking and the reactiveness or proactiveness that an organization will take in its strategic decision-making processes (Miller, 1987:8).

Relationships between Organizational Structure and Strategic Decision Making

Relationships between the dimensions of organizational structure and strategic decision making process have been established in previous research. Integration and formalization have been shown to be related to rationality (Frederickson, 1986:287; Miller 1987:27). These dimensions are important to setting the stage for strategic decision-making by influencing the types of participants, their ranges of specialization, and the forums in which they interact. Centralization has been related to rationality. The level of centralization impacts upon the goal setting strategy an organization employs and the likelihood that strategic decision making will be a proactive, opportunity seeking process (Frederickson, 1986:285). However, Miller found centralization had a limited impact on strategic decision-making (Miller, 1987:24).

Research Objective

Research investigating the relationships between organizational structure and strategic decision-making has primarily focused on model-building and the establishment of theoretical constructs. This study adapted an established model to the investigation of the relationship between the strategic decision-making processes and the organizational structure of USAF logistics organizations.

Miller developed a model where linkages were established between the three attributes of strategic decision making--rationality, interaction, and assertiveness--and three dimensions of organizational structure--centralization, formalization, integration, and complexity.

In his survey of 97 small commercial firms, he noted the following relationships:

1. After combining the formalization and integration variables into the aggregated variable "formal integration," Miller found formal integration, especially the use of liaison devices, related significantly to the rationality and interaction factors of strategy making (Miller, 1987:22). Formal integration was found not to relate significantly to the assertiveness factor.

2. Centralization was negatively related to the overall interaction and assertiveness factors and insignificantly related to the rationality factor (Miller, 1987:23).

3. Complexity proved insignificantly related to any of the strategic decision making factors (Miller, 1987:23).

Table 1 summarizes the relationships between these factors as researched by Miller. A plus (+) indicates a positive correlation; a negative (-) indicates a negative correlation; a blank ( ) indicates no correlation. This study will seek to establish the linkages between the strategic decision-making process and organizational structure of USAF logistics organizations by examining the relationships shown at Table 1 in an Air Force context.

Research Question

In adapting to the change from three to two levels of maintenance, what will be the relationship and interaction between the dimensions of structure and strategic decision making processes of the major USAF logistics organizations?

TABLE 1

SUMMARY OF EXPECTED RELATIONSHIPS

Structural Dimensions	Relationships with Strategy Making		
	Rationality	Interaction	Assertiveness
Integration	+	+	+
Formalization	+	+	-
Centralization	( )	-	-

(Miller, 1987:22-24)

Hypotheses

1a. Integration will be positively associated with rationality and interaction (Miller, 1987:23).

The rationality dimensions are strongly related to the use of structural integration devices such as task forces and committees (Galbraith, 1973:50-53). Such devices provided a forum for discussions among managers, allowing the generation of new ideas and the broader assessment of problems, proposals, and projects.

1b. Integration will be insignificantly associated with assertiveness (Miller, 1987,23).

2a. Formalization will be positively associated with rationality and interaction (Miller, 1987:23).

Formalization provides organizations with analytical capabilities and expertise needed for systematic and overtly rational modes of decision making. Formal controls also provide quantitative operational information that motivates analytical followups.

2b. Formalization will be insignificantly associated with assertiveness (Miller, 1987:23).

Formalization of policies and procedures can reduce assertiveness by increasing "the likelihood that strategic processes will be motivated by reactive as opposed to proactive behavior" (Fredrickson, 1986:287). People may lack initiative, ignoring opportunities that no formal system monitors, responding only to obvious and pressing problems.

3. Centralization of power for making decisions will be negatively associated with interaction and assertiveness (Miller, 1987:23).

Centralization discourages rationality by sequestering decision making to top executives, taxing their cognitive abilities and imposing significant time constraints on them. It may impede analysis and planning (Miller, 1987:23).

Scope and Limitations

This study was based on a model proposed by Miller (1987). A major difference between the two research efforts is the diversity of organizations considered. Miller's research encompassed a number of distinct organizations positioned in several industries. The scope of this study was limited to investigating the relationship between organizational structure and strategic decision-making of Air Force organizations.

Chapter Summary

The initiative to change from a three-level to a two-level maintenance concept for most USAF aircraft greatly impacts the logistics requirements for those aircraft. Successful implementation of this

change is dependent upon the adaptability of USAF logistics organizations' structures and strategic decision-making processes. The change in aircraft maintenance concepts presents an opportunity to investigate the dynamics between USAF logistics organizations' structure and strategic decision-making processes. This interaction can be analyzed by examining the relationship between the three organizational structural dimensions--centralization, formalization, and integration--and the strategic decision-making processes dimensions--rationality, integration, and assertiveness.

II. Literature Review

Introduction

The initiative to change from a three-level to a two-level maintenance concept for most USAF aircraft greatly impacts the logistics requirements for those aircraft. Successful implementation of this change is dependent upon the adaptability of USAF logistics organizations' structures and strategic decision-making processes. This interaction can be analyzed by examining the relationship between the organizational structural dimensions of centralization, formalization, and integration and the strategic decision-making processes dimensions of rationality, integration, and assertiveness. This literature review should provide a better understanding of the attributes of organizational structure and strategic decision making processes.

This chapter discusses the literature on organizational structure and organizational decision making. The first section reviews the research on structure and seeks to establish the agreements on the dimensions of structure. The second section reviews the research on decision making and seeks to establish the agreements on the variables of decision making. The third section reviews the research that relate structure to decision making and seeks to establish the agreements on the determinants of the relationship.

Structure

Organizational structure is defined in as many ways as there are authors. Blau defined structure as "the distribution, along various lines, of people among social positions that influence the role

relations among these people" (1974:12). Jackson and Morgan defined it as "the enduring allocation of work roles and administrative mechanisms that allow organizations to conduct, coordinate, and control their work activities" (1982:81). Chandler referred to structure as the design of organization through which an enterprise is administered (1962:14). Simon perceived it as the framework that allows organizations to achieve "organizationally rational outcomes" in spite of their members' cognitive limitations because it delineates responsibilities and establishes communication channels (1987:27).

What emerges from each of these definitions is a continuity of thought on what structure defines and provides for organizations. Structure implies a "division of labor," the allocation of tasks or jobs within organizations; a "hierarchy," the allocation of rank and responsibility within organizations; a "set of rules and regulations," the direction given to people on how to behave within the organization; and "channels of communication," the means of coordinating across organizations (Hall, 1982:53-54; Galbraith, 1973:110).

Structure is the framework against which organizations produce outputs and achieve organizational goals. It regulates the impact of the individual on organizations. Structure provides the setting in which power is exercised, in which decisions are made, and in which organizational activities are carried out (Hall, 1982:54).

Despite the numerous forms it can take, the analysis of organizational structure has led to agreement on its basic dimensions.

Centralization (hierarchy) refers to the degree to which decision-making and evaluating activities are concentrated. The higher the level

in the organization decisions are made and the less participation that exists in decision-making, the greater the centralization (Zaltman and others, 1973:161).

Formalization (a set of rules and regulations) specifies the extent to which an organization uses rules and procedures to prescribe behavior. It specifies how, where, and by whom tasks are to be performed (Frederickson, 1986:283). Formal documentation includes written rules and procedures, job descriptions, regulations, and policy manuals (Daft and Steers, 1986:219).

Complexity (division of labor) refers to the state of having many, usually interrelated parts. It has three potential sources--horizontal and vertical differentiation, and spatial dispersion (Hall, 1982:78-83). Complexity is reflected in the breadth of the span of control, the number of levels, and the number of operating sites that an organization possesses.

Integration (channels of communication) describes the extent to which liaison devices, such as task forces and committees, are used to foster collaboration among units within an organization (Lawrence and Lorsch, 1967:11; Mintzberg, 1979:178).

Despite the agreement on the dimensions of organizational structure, there is little agreement on the relationship of these dimensions to each other, to strategy making, and to the environment, making for a rich literature.

Table 2 outlines the organizational structure material that is reviewed.

TABLE 2

ORGANIZATIONAL STRUCTURE DIMENSIONS AND THEIR SOURCES IN THE LITERATURE

Dimension	Author	Definitive Work
Centralization/ Formalization/ Complexity	Weber	The Theory of Social and Economic Organization
	Burns & Stalker	The Management of Innovation
	Aston Group	"An Empirical Taxonomy of Work Organizations"
	Child	"Organization Structure and Strategies of Control"
	Hage & Aiken	Social Change in Complex Organizations
	Zaltman, Duncan, & Holbek	Innovations and Organizations
Integration	Lawrence & Lorsch	Organization and Environment
	Mintzberg	Mintzberg on Management
	Galbraith	Designing Complex Organizations

Centralization, Formalization, and Complexity. Centralization, formalization, and complexity were among the first dimensions of organizational structure identified in the literature. They provided the means for viewing structure that may vary from one situation to the next.

Weber. Weber made the first attempt to produce systematic categories for organizational analysis (Pugh and Hickson, 1989:11). His theory of authority structures led him to characterize organizations in terms of the authority relations within them.

Weber was concerned with why individuals obeyed commands, why people do as they are told. To deal with this problem, Weber made a distinction between "power," the ability to force people to obey, regardless of their resistance, and "authority," where orders are voluntarily obeyed by those receiving them (1947:27). Weber distinguished between organizational types according to the way in which authority is legitimized. He outlined three pure types: charismatic, traditional, and rational-legal (Weber, 1947:58). Each expresses a particular administrative organization, of which any real organization may be a combination of them.

The charismatic organization is based on the personal qualities of the leader (Weber, 1947.75). Weber used the Greek term "charisma" to mean any quality of individual personality by virtue of which the leader is set apart from ordinary people and treated as endowed with exceptional ability.

The traditional organization draws its authority from precedent and prior usage (Weber, 1947:90). The rights and expectations of various groups are established in terms of taking what has always happened as sacred; the great arbiter in such a system is custom.

The rational-legal organization is based on rational analysis and its bureaucratic organizational form (Weber, 1947:102). The system is called rational because the means are designed expressly to achieve certain specific goals. It is legal because authority is exercised by means of a system of rules and procedures through the office which an individual occupies at a particular time. Weber stated a bureaucracy has a hierarchy of authority, limits on authority, division of labor, technically competent participants, procedures for work, rules for

incumbents, and differential rewards. He concluded that a bureaucratic organization is technically the most efficient form of organization possible (Weber, 1947:334).

The reason for the efficiency lies in bureaucracy's organizational form (Weber, 1947:335). In such organizations there is a series of officials whose roles are prescribed by a written definition of their authority. These offices are arranged in a hierarchy, each successive step embracing all those beneath it. There is a set of rules and procedures within which every possible contingency is theoretically considered.

For Weber, this created a highly efficient system of coordination and control. The rationality of the organization shows in its ability to "calculate" the consequences of its action. "Bureaucratic administration means fundamentally the exercise of control on the basis of knowledge" (Weber, 1947:336).

Burns and Stalker. Burns and Stalker suggested that organizational structure is contingent upon the rate of environmental change. They described two "ideal types" of management organization that serve as the extreme points of a continuum of environment where conditions range from stable to volatile environments. Most organizations can be placed somewhere between the two types of organizations.

The "mechanistic" type of organization is adapted to relatively stable conditions (Burns and Stalker, 1961:119). In it, the problems and tasks of management are specialized and formalized such that each individual carries out an assigned and precisely defined task. There is

a clear hierarchy of control with the responsibility for the overall knowledge and coordination centralized firmly at the top of the hierarchy.

The "organic" type of organization is adapted to unstable conditions where new and unfamiliar problems continually arise that challenge the existing organization (Burns and Stalker, 1961:121). This type of organization is characterized by a continual adjustment to and redefinition of individual tasks and a network structure of control, authority, and communication. Interactions and communication may occur at any level as required by the process, and a much higher degree of commitment to the aims of the organization as a whole is generated.

The Aston Group. The Aston group refers to a series of researchers in the United Kingdom who were associated with each other at the University of Aston in Birmingham. The Aston Group blended psychological research methods and assumptions with concepts of organizations. They sought to link organizational structure and functioning, group composition and interaction, and individual personality and behavior (Pugh and others, 1969:115). The researchers used the following as the primary structural variables (Pugh and others, 1969:118):

Specialization of functions and roles

Standardization of procedures

Formalization of documentation

Centralization of authority

Configuration of role structure

They proposed that three distinct elements aptly could classify organizations. The "structuring of activities" is the degree to which the activities of personnel are standardized. It is an aggregate of an organization's specialization, standardization, and formalization. The "concentration of authority" is the degree to which decision making authority is concentrated at the top and is independent of outside agencies. The "line control of workflow" is the degree to which control is exercised by line personnel versus being prescribed by formalized procedures (Pugh and others, 1969:119).

In an investigation of these elements among British industrial firms, the Aston Group found an organization's size and degree of dependence upon other organizations dictated much of its structure. The larger an organization is the more likely its employees are to work in very specialized functions using standard procedures and formalized documentation. The more dependent an organization is upon a few suppliers or customers, the less autonomy it is likely to have in its own decision making (Pugh and others, 1969:395).

Child. Child replicated the Aston studies. As did the Aston Group, he found a strong relationship between specialization, standardization, formalization and complexity. Contrary to the Aston Group, however, he found a relationship between those variables and centralization. Child established that organizations with fewer standard procedures for regulating and recording behavior tend to centralize decision making (1972b:174). Based on this, he rejected the Aston Group assertion that the elements of structuring of activities and concentration of authority were mutually exclusive. Child suggested a

modification to the Aston position on centralization is warranted. He contended that a "unitary conception of the dimensions of organization" is required where each dimension of organizational structure (specialization, standardization, formalization, complexity, and centralization) bears directly upon the determination of the "structuring of activities" (Child, 1972b:174).

Hage and Aiken. Hage and Aiken focused on the characteristics of structure and their relationship to the process of innovation. They posited that there was a direct relationship between the process and rate of innovation and the magnitude of the dimensions of an organization's structure. Figure 1 depicts the relationships between the organization structure variables and the innovation process they posited.

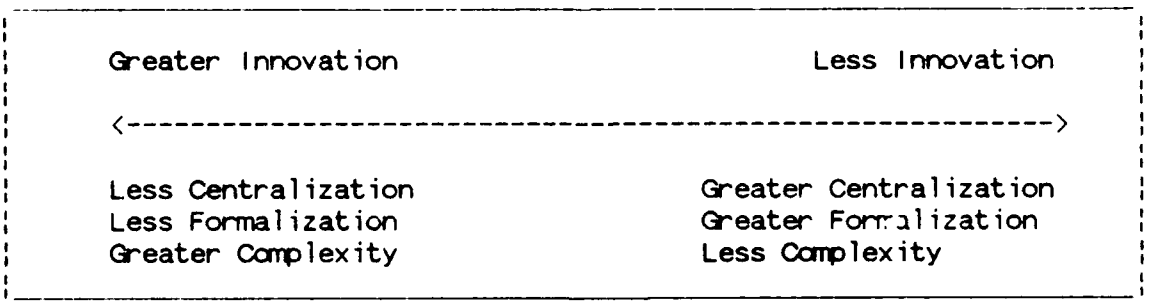


Figure 1. Hage and Aiken's Organizational Structure Variables and Innovation Process Relationships

Hage and Aiken defined centralization as the way power is distributed in an organization such that the smaller the proportion ofthe number of decision making areas in which employees are involved, the jobs and occupations that participate in decision making, and the fewermore centralized the organization (1970:38). Hage and Aiken

predicted that the higher the degree of centralization, the lower the rate of innovation. Support for this assertion is provided by (1) when power is located in the hands of few individuals, these individuals are less likely to experiment because they feel they might lose their power; (2) more participation in decision making (less centralization) has the potential for bringing many diverse ideas forward than may identify new areas for change; and (3) more decentralization leads to conflict in perspectives for dealing with issues (Hage and Aiken, 1970:38-39; Zaltman and others, 1973:179).

Hage and Aiken defined formalization as the degree of codification of jobs in the organization, such that the greater the number of rules specifying what is to be done and the more strictly they are enforced, the greater the formalization of the organization (1970:43). They predicted that the greater the degree of formalization, the lower the rate of innovation (Hage and Aiken, 1970:43). The logic here is (1) highly formalized rules offer little latitude to consider alternative ways about performing them; (2) high emphasis on rules may discourage better alternative ways at performing because deviation may bring punishment; and (3) members may simply assure that existing rules offer the best way of performing (Hage and Aiken, 1970:43-44; Zaltman and others, 1973:1980).

Hage and Aiken defined complexity by the number of occupational specialties in the organization and the degree of professionalism of each, such that the longer the period of training for the occupation and the greater the number of professional occupations, the more complex the organization (1970:33). They predicted greater complexity leads to greater program change. The rationale for this is (1) more professional

employees are more likely to be concerned about keeping abreast of knowledge, which makes them more likely to recognize a need for change; (2) because of the existence of very different groups, the organization is likely to have more varied sources of information available for developing new programs (Hage and Aiken, 1970:37; Zaltman and others, 1973:179).

Zaltman, Duncan, and Holbek. Zaltman, Duncan, and Holbek, like Hage and Aiken, investigated the process of innovation in organizations. They argued that different configurations of organizational structure facilitate the innovation processes as it evolves through its different stages (Zaltman and others, 1973:154). They contended the organization must shift its structure as it moves through the various stages of innovation. During the initiation stage of innovation, a higher degree of complexity, lower formalization, and lower centralization allow the organization to gather and process the information needed for knowledge awareness, attitude formation, and decision making (Zaltman and others, 1973:157). During the implementation stage, a lower degree of complexity, higher formalization, and higher centralization permit the organization to reduce role conflict and ambiguity (Zaltman and others, 1973:155).

Integration. Recent literature added integration as a fourth dimension of structure. As defined above, integration describes the extent to which liaison devices, such as task forces and committees, are used to foster collaboration among units within an organization (Lawrence and Lorsch, 1967:11; Mintzberg, 1979:178).

Lawrence and Lorsch. Lawrence and Lorsch contended people establish organizations to find better solutions to the environmental problems facing them (1967:6). Organizations are formed by people, with definite purposes, who have to come together to coordinate their different activities into an organization. The effectiveness of an organization is judged by its ability to satisfy the needs of the interested parties in meeting the demands of the environment.

At the core of Lawrence and Lorsch's model of organizational functioning is the basic need for an organization to possess both appropriate differentiation and adequate integration to perform effectively in the external environment (1967:49-53). Organizations develop segmented units to deal with definite aspects of the environment. This "differentiation" of function and task results in conflicts between the different orientations among the managers in different units, and in conflicts between the formal structures of different departments. The organization must possess an integrative system so that coordination and collaboration can occur between the disparate units. This integration must be responsive to the nature of the external conditions.

The Lawrence and Lorsch framework emphasizes that the appropriate organization structure depends upon the demands of the environment. They took a "contingency" approach, rejecting the idea that one particular structural form or one particular motivational approach is best (Lawrence and Lorsch, 1967:209-210). Appropriateness to the environment is the key to organizational structure.

Mintzberg. Mintzberg established six basic parts to an organization:

1. The "operating core" are those people who perform the basic work or producing the products and rendering the services.

2. The "strategic apex" is represented by the manager at the top of organization who oversees the whole system.

3. The "middle line" is created as an organization grows and more managers are needed. It forms a hierarchy of authority between the operating core and the strategic apex.

4. The "technostructure" is created when the organization becomes more complex and requires "analysts" who plan and control formally the work of others as a "staff."

5. The "support staff" is added to provide various internal services, from cafeteria and mailroom to a legal counsel or public relations office.

6. Every active organization has its "ideology" or "culture." This encompasses the traditions and beliefs of an organization that distinguishes it from other organizations and infuse a certain life in the skeleton of its structure (Mintzberg, 1989:98).

The essence of Mintzberg's organizational design is that the manipulation of a series of parameters determines an organization's division of labor and means of coordination. Mintzberg's main parameters of structural design included job specialization, behavior formalization, training, indoctrination, unit grouping, unit size, planning and control systems, liaison devices, and decentralization (1989: 103-105).

With the above as the bases of research, Mintzberg established five basic designs of organization: simple structure, machine bureaucracy, professional bureaucracy, divisional form, and the adhocracy (1989:98). The primary feature that distinguishes the different designs is that one from among five basic parts of organization predominates. Each of the five parts exerts a "pull" upon the organization. To the extent that conditions favor one over the others, the organization is drawn to structure itself as one of the configurations or designs.

In a "simple structure," the predominant part is the "strategic apex," which in the case of a manufacturer, for example, would be the Board of Directors, President, or Chief Executive Officer, and their personal staff.

In a "machine bureaucracy", the predominant part is the techno-structure which includes the personnel in planning, finance, training, operations research, and production scheduling.

The key part in a professional bureaucracy is the "operating core," those at the working base of the organization. These would include doctors and nurses in a hospital or the teaching staff in a college.

The "middle line" are key parts in the divisionalized form of organization. It is represented by those personnel who "manage managers" in the hierarchy between the strategic apex and the operating core. In manufacturing, these would include the heads of the production and sales functions, and the managers and supervisors beneath them.

In an adhocracy, the "support staff" are the key part. In a typical manufacturing organization, the support staff might be in public relations, industrial relations, pricing, and payroll.

Mintzberg's research suggests the organizational dimensions provide the basis for discriminating among organizations. The integration dimension provides the connections within the organization.

Galbraith. Galbraith wrote that a major organizational structure problem is the need for the establishment of integrative mechanisms that permit coordinated action and information across the large numbers of interdependent roles in an organization (1973:47). The information processing requirements facing an organization were related primarily to the degree of task uncertainty. Task uncertainty was defined as the difference between the amount of information required to coordinate cooperative action and the amount of information actually possessed by the organization (Galbraith, 1973:108-109). Each type of mechanism has a range over which it is effective. As described below, the mechanisms fall along a continuum that starts with low-level information processing and increases the amount of information generated by increasing task uncertainty (Galbraith, 1973:109-115):

1. Creation of slack resources reduced the level of performance. Lower performance reduced interdependence between roles and made it unnecessary to consider large number of decision factors simultaneously.

2. Creation of self-contained units occurred when groups of input resources were devoted solely to one output category. By making all resource groups self contained, there was no need to process information

about resource sharing among outputs and, because of reduced division of labor, coordinate roles.

3. Investment in the vertical information system expanded the capacity of hierarchical channel of communications, created new ones, and increased the capacity of decision mechanisms.

4. Creation of integrative mechanisms selectively implemented communication channels across lines of authority.

Integrative mechanisms are needed because an informal organization did not spontaneously arise to coordinate interdependencies not encompassed by the formal hierarchy of authority (Galbraith, 1973:110). The choice of integrative mechanism is not random. The organization chooses from mechanisms along a continuum that represents a range of commitment to more complicated and expensive mechanisms of coordination. Below is a sequence of integrative mechanisms listed by increasing ability to handle information for and by increasing costs to the organization (Galbraith, 1973:110):

1. Direct contact between managers
2. Creation of liaison role
3. Creation of task forces
4. Use of teams
5. Creation of integrating role
6. Change to managerial linking role
7. Establishing the matrix form

Galbraith proposed organizations pursuing strategies characterized by interdepartmental activity, high uncertainty, and high diversity will select mechanisms farther down the list than those organizations

pursuing strategies characterized by low uncertainty and diversity (Galbraith and Kazanjian, 1986:74).

Summary. This section reviewed the organizational structure literature and identified a consensus of thought that structure can be characterized along the following dimensions: centralization, formalization, complexity, and integration. The research was taken across numerous industries and government agencies. The dimensions are useful in characterizing the structure of USAF logistics organizations.

Strategic Decision Making Process

As difficult as it is to characterize the structure of an organization, it is perhaps even more difficult to describe strategy making. The strategic decision making process includes the cognitive and social activities comprising the deliberations, actions, and interactions of managers making strategic decisions. The literature converges around three multifaceted dimensions of the strategic decision making process: rationality, assertiveness, and interaction (Miller, 1987:8). Table 3 outlines the literature on strategic decision making that is reviewed.

Rationality. Rationality is central to two schools of thought. The first school suggests that rationality is the process by which an organization defines a problem, defines expectations, develops alternative solutions, and provides a course of action after a decision is reached (Archer, 1980:60). During the strategic decision making process, an organization engages in careful analysis by systematically scanning markets for problems and opportunities and methodically

planning and articulating unified strategies (Miller, 1987:8). In contrast, the second school contends that during the strategic decision-making process, an organization is subject to bounded rationality where people have limits to how rational they can be. Instead, decision makers do little analysis, emphasize satisficing, and formulate strategy according to a disjointed process (Simon, 1987:13-16).

TABLE 3

STRATEGIC DECISION MAKING AND ITS SOURCES IN THE LITERATURE

Variable	Author	Definitive Work
Rationality	Thompson	Organizations in Action
	Lindblom	"The Science of Muddling Through"
	Simon	Administrative Behavior
Interaction	Cyert & March	A Behavior Theory of the Firm
	Child	"Strategies of Control and Organizational Behavior"
	Burns & Stalker	The Management of Innovation
Assertiveness	Miles & Snow	Organizational Strategy, Structure, and Process

Thompson. Thompson contended organizations continually strive to act rationally in the face of technological and environmental uncertainties. The basic problem is deciding how to cope with these uncertainties.

Organizations aspire to be reasoned and orderly despite circumstances and events which may prevent their being so. The

standards, or "norms of rationality," require that management make decisions to provide for coordination within the organization and means to adjust to circumstances outside it (Thompson, 1967:54).

According to Thompson, decision making involves beliefs and assumptions as to what will happen if one action is taken rather than another and preferences as to what is most desirable (1967:134). Accompanying this is the greater certainty about some beliefs and preferences than for others. Figure 2 depicts Thompson's matrix showing the four likely kinds of decision making strategies.

		Preferences regarding possible outcomes	
		Certainty	Uncertainty
Beliefs about cause/ effect relations	Certain	Computational Strategy	Compromise Strategy
	Uncertain	Judgmental Strategy	Inspirational Strategy

(Thompson, 1967:134)

Figure 2. Thompson's Decision Making Strategy Matrix

In the cell with certainty on both variables, a "computational" strategy can be used. In this case the decision is obvious and can be performed by a computer with great simplicity. The other cells present greater challenges.

> When outcome preferences are clear, but cause/effect relationships are uncertain, we will refer to the judgmental strategy for decision making. Where the situation is reversed and there is certainty regarding cause/effect but

> uncertainty regarding outcome preferences, the issue can be regarded as calling for a compromise strategy for decision making. Finally where there is uncertainty on both dimensions, we will speak of the inspirational strategy for decision making, if indeed any decision is forthcoming. (Thompson, 1967:134-135)

In Thompson's view, the aim of management and administration when designing organizations and making decisions is to be effective in aligning the organization's structure, technology, and environment.

Lindblom. Lindblom proposed two approaches to how decisions should be made and how they are made. The first approach, the "rational deductive ideal," required that all values be ascertained and stated precisely enough for them to be arranged in order of priority. Principles should then be derived thereby indicating what information is necessary to allow the comparison of every possible alternative; the means of how the information is to be obtained; and the standards against which the best alternative is to be chosen (Lindblom, 1959:80). This is an ideal of science, the completely deductive system. If followed, it would produce a "synoptic approach" to decision making.

The second approach, the "strategy of disjointed incrementalism," presented a way to proceed by successive limited comparisons where change is made in small increments by disjointed or uncoordinated processes. An increment is a small change in an important variable. It makes an indefinite and disorderly series of small moves away from day-to-day problems toward a defined goal (Lindblom, 1959:82).

Lindblom contended this is the decision making strategy used most often by decision makers. Rather than rationally exploring all possibilities, the decision maker simplifies a problem by contemplating only the margins by which circumstances might, if altered, differ.

Since only marginal change is examined, the range of alternatives and consequences to be considered is limited (Lindblom, 1959:85).

The strategy of disjointed incrementalism scales problems down to size. It limits information, restricts choices, and shortens horizons so that something can be done. What is overlooked now can be dealt with later. The strategy recognizes diverse values, but discourages intransigence by those involved because its reconstructive nature avoids evaluation of organizational assumptions which, if redefined, would provoke a strategic change in direction.

Simon. For Simon, "management" is equivalent to "decision making" (1976:12). He described three stages in the overall process of making a decision (Simon, 1976:22-26):

1. Finding occasions calling for a decision--the "intelligence" activity;

2. Inventing, developing, and analyzing possible courses of action--the "design" activity;

3. Selecting a particular course of action from those available --the "choice" activity.

Generally speaking, intelligence activity precedes design, and design activity precedes choice; but the stages themselves and the sequences of stages can be very complex decision making process.

Simon also regarded the carrying out of the decision as a decision making process. After a policy decision has been taken, the manager has to implement it, facing a wholly new set of problems involving decision making. Executing policy amounts to making more detailed policy.

In carrying out the decision making process, Simon proposed the model of the "administrative man" in place of the rational "economic man." While the economic man maximizes, the administrative man "satisfices," looking for the course of action that is satisfactory or "good enough" (Simon, 1976:59). In this process, decision makers are content with gross simplification and take into account only those comparatively few relevant factors which their minds can encompass. The administrator who satisfices can make decisions without searching for all possible alternatives and can use heuristics.

Interaction

Interaction describes the strategic decision-making process in terms of the organization's political and social processes (Miller, 1987:8). Although political processes may vary greatly in nature and intensity, most organizations are political bodies in which bargaining, politicking, and consensus-building often come to bear on decisions.

Cyert and March. Cyert and March proposed that an organization is a shifting multiple-goal political coalition where the composition of the firm is not given, but is "negotiated;" and the goals of the firm are not given, they are "bargained" (1963:18). The coalition includes managers, workers, stockholders, suppliers, customers, lawyers, tax collectors, and other agents of the state, as well as all the subunits or departments into which an organization is divided. Each group has its own preferences about what the firm should be like and what its goals should be. Hence, negotiation and bargaining, rather than detached rationality, are the bases of decision making.

Child. Child noted that the internal politics of organizations determine the structural forms, the manipulation of environmental features, and the choice of relevant performance standards selected by organizations (1972b:20). The internal politics themselves are dependent upon the existing power arrangements in the organization. Child wrote that "this unitary conception of organizational control structure does not posit an identity of structuring of activities and decentralization, but rather a recognition of how these dimensions from two related elements in the strategy of administrative control" (1972b:21).

Burns and Stalker. Burns and Stalker maintained organizations need to be viewed as the simultaneous workings of three social systems (1961:134-142).

The first of these is the formal authority system derived from the aims of the organization, its technology, its attempts to cope with its environment. This is the overt system about which all decision making literature revolves.

The second is the career system where decisions taken in the overt structure inevitably affect the differential career prospects of the members, who will evaluate them in terms of the career system as well as the formal system.

The third system is the political system. Every organization is a scene of political activity in which individuals and departments compete and cooperate for power.

All decisions in the overt system are evaluated for their relative impact on the power structure as well as for their contribution to the achievement of the organization's goals.

Assertiveness

Assertiveness is the willingness of an organization to consider and implement ideas, formulas, or programs that the individuals involved perceive as new (Zaltman and others, 1973:7). It comes to the fore when a given program of activity no longer satisfies performance criteria and a new direction is required (March and Simon, 1958:172). Assertiveness is more prevalent in uncertain environments rather than stable environments (Mintzberg, 1979:270-272). Assertiveness is measured in terms of the levels of risk taking and the reactiveness or proactiveness that an organization will take in its strategic decision-making processes (Miller, 1987:8).

Miles and Snow. Miles and Snow investigated why organizations differ in strategy, structure, technology, and administration. As did Thompson, they found the decisions made regarding the alignment of organization and environment was at the heart of the differences. This alignment was determined by the degree of assertiveness the organization puts forth in contending with its environment (Miles and Snow, 1978:20).

To align organization and environment successfully, Miles and Snow contended management has to simultaneously and continually solve the entrepreneurial, engineering, and administrative problems (1978:32). The entrepreneurial problem is to choose a field of operation in which the organization can be viable. The engineering problem is to find ways

of making the products or providing the service. The administrative problem is to organize and manage the work.

The aim of the organization's decision making is to establish an effective "adaptive cycle" where the three problems are approached in a coherent, mutually complementary way (Miles and Snow, 1978:25).

Miles and Snow identified four "adaptive strategies" arranged along a continuum described by organizational assertiveness (1978:29). Depending upon the strategy they pursue, organizations are named Defenders, Prospectors, Analyzers, and Reactors. Defenders and prospectors are at opposite ends of the continuum. Defenders permit little change to occur. Prospectors are proactive and willingly take risks in seeking opportunities for change and experimentation. Analyzers exhibit features of both defenders and prospectors. Analyzers perceive change but wait for competing organizations to develop responses and then adapt to them. Reactors are unable to pursue consistently any of the other three types of strategies and simply react to pressures. Figure 3 depicts Miles and Snow's continuum of the four adaptive strategies.

Summary. In this section, the literature was shown to have converged around three multifaceted variables of the strategic decision making process: rationality, assertiveness, and interaction. The literature supports that the variables are viable in characterizing strategic decision making in USAF logistics organizations.

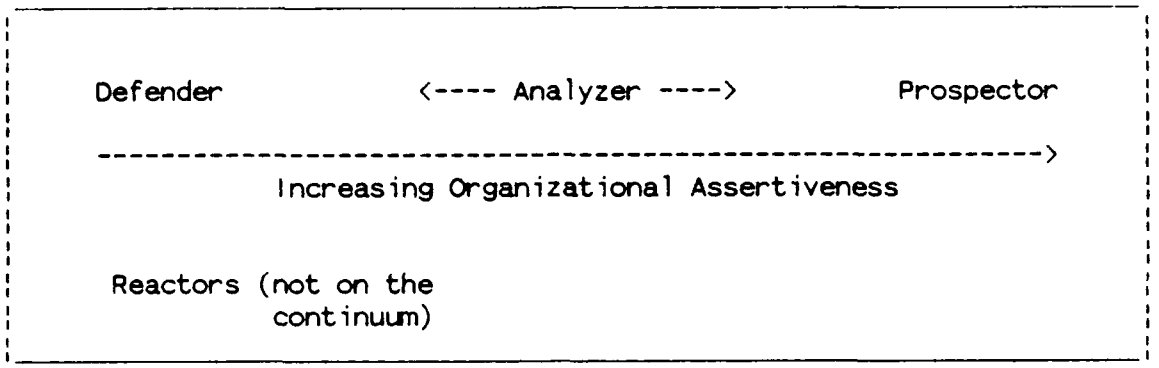


Figure 3. Miles and Snow's Four Adaptive Strategies

Relating Organizational Structure to Strategy

A central gap in the literature has been the failure to link the theories of organizational structure and organizational strategy. In recent research, however, the variables and dimensions describing both have been integrated.

Rationality has been shown to be related with three aspects of formalization--controls, specialization, and the use of formal policies and procedures. Organizations with their requirements for analysis and coordinating activities gather detailed information for assessing strategic decisions, use formal controls and budgets, and recruit specialists to perform specific jobs (Miller, 1987:22). Also, the structure of organizations can highlight problems and opportunities that promote further analysis, coordination, and, often, change (Miller, 1987:22). Organizations make use of liaison devices, such as task forces and committees. Liaison devices provide a forum for discussions among managers and allow the generation of novel ideas through the participation of managers with different backgrounds (Lawrence and Lorsch, 1967:50). This gives rise to a critical exchange of ideas and information that promotes further analysis. Frederickson argued

rationality may be associated with the centralization of authority (1986:283). Decentralization avoids taxing the cognitive limitations of a CEO by giving power to decision makers with specialized expertise.

Interaction and its attributes of bargaining, politicking, and consensus-building have been related to the decision making in large and decentralized organizations.

Assertiveness has been related to complexity. Small entrepreneurial firms have been shown to take bold risks and act on rather than react to their environments. More complex organizations have been shown to behave conservatively and act only incrementally and in response to problems.

Although there appears to be agreement in the literature as to what the dimensions of organizational structure and decision making are, there is a general disagreement in the literature regarding the cause and effect relationship of structure and strategy.

Table 4 outlines the literature on relating organizational structure to strategy that is reviewed.

March and Simon. March and Simon struck at the heart of the relationship by arguing that an organization's structure imposes "boundaries of rationality" that accommodate members' cognitive limitations. By limiting responsibilities and communication channel, structures allow organizations to achieve "organizationally rational outcomes" in spite of their members' cognitive limitations (March and Simon, 1958:36). It also helps management control the decision making environment and facilitate the processing of information. March and

TABLE 4

LITERATURE RELATING ORGANIZATIONAL STRUCTURE TO STRATEGY

Variable	Author	Definitive Work
Relating Structure & Decision Making	March & Simon	Organizations
	Chandler	Strategy and Structure
	Galbraith	Designing Complex Organizations

Simon concluded the characteristics of a firm's strategic decision making process is determined by its overall, dominant structure (1958:135).

Chandler. In opposition to Simon and March, Chandler asserted that the structure of an organization follows from the strategy it adopts (1962:14). Chandler perceived strategy as the determination of basic long-term goals and objectives with the adoption of courses of action and the allocation of resources for carrying out those goals. Structure is the organization which is devised to administer the activities which arise from the strategies adopted. As such, it involves the existence of a hierarchy, the distribution of work and lines of authority, communication, and the information and data that flow along those lines (Simon, 1962:16).

Galbraith. In agreement with Chandler, Galbraith contended all organizations differentiate their structures so that each department or unit is assigned a task directly related to the organization's strategy and environment (1973:110). Organizations integrate the

differentiated functions around their interdependencies, as determined by their strategies. Galbraith discussed four design strategies. The theory underlying the framework was based on the premise that observed variations in organizational structure result from the various strategies organizations adopt in response to information processing requirements (Galbraith, 1973:108). The information processing requirements confronting an organization were primarily related to the degree of task uncertainty, which was defined as the difference between the amount of information required to coordinate cooperative action and the amount of information actually possessed by the organization (Galbraith, 1973:109). The amount of information required was a function of output diversity, the division of labor, and the level of performance. The greater each of these factors were, the greater the number of factors that had to be considered simultaneously in order to reach decisions.

Summary. In the literature, no consensus has been achieved in agreeing on the interrelatedness of organizational structure and decision making. This study addresses that question using an Air Force context. The hypotheses proposed in Chapter I directly address the relationship between structure and decision making.

Chapter Summary

A review of the literature demonstrated the continuity of thought that exists on what dimensions define structure and what variables define decision making.

Structure implies a "division of labor," the allocation of tasks or jobs within organizations; a "hierarchy," the allocation of rank and

responsibility within organizations; a "set of rules and regulations," the direction given to people on how to behave within the organization; and "channels of communication," the means of coordinating across organizations (Hall, 1982:53-54; Galbraith, 1973:110). The analysis of the organizational structure literature led to the identification of the following dimensions: centralization, formalization, complexity, and integration.

The strategic decision making process included the cognitive and social activities comprising the deliberations, actions, and interactions of managers making strategic decisions. The literature converged around three multifaceted variables of the strategic decision making process: rationality, assertiveness, and interaction (Miller, 1987:8).

In the literature, no consensus has been reached on the interrelatedness of organizational structure and decision making.

As seen in the literature, the focus of the research investigating organizational structure and strategic decision making has been on model-building and the establishment of theoretical constructs. This study applied one of those models to a real world situation. It adapted an established model to investigate the relationship between the strategic decision-making processes and the organizational structure of USAF logistics organizations. The model uses the dimensions of organizational structure and the attributes of strategic decision making that were discussed in this chapter as its bases of investigation. Chapter III delineates the methodology used to acquire and analyze the information necessary to analyze the relationship between structure and strategy.

III. Methodology

Introduction

This research addressed the relationship and interaction between the dimensions of structure and strategic decision making processes of the major USAF logistics organizations in adapting to the change from three to two levels of maintenance. The change in aircraft maintenance concept greatly impacts the USAF logistics organizations. Successful implementation of this change is dependent upon the adaptability of USAF logistics organizations' structures and strategic decision-making processes.

In Chapter II, the structure literature identified the following dimensions--centralization, formalization, complexity, and integration--as characterizing organizational structure. The strategy making literature identified the following variables--rationality, interaction, and assertiveness--as characterizing organizational strategy making.

Using the identified structural dimensions and decision making variables, the research design and methodology used in this study assessed the interrelationship of the variables among USAF logistics organizations.

This chapter presents the path pursued to collect a reliable body of data that provide the basis for testing the hypotheses proposed in Chapter I. The chapter discusses the method and means of data collection. A profile of the study's target population and a discussion of its response are presented. The chapter concludes with an examination of the statistical methods employed to analyze the data.

Research Paradigm

The research paradigm was adapted from a model proposed by Miller (Miller, 1987). In his survey of 97 small commercial firms situated in various industries, he noted the following relationships:

1. After combining the formalization and integration variables into the aggregated variable "formal integration," Miller found formal integration, especially the use of liaison devices, related significantly to the rationality and interaction factors of strategy making (Miller, 1987:22). Formal integration was found not to relate significantly to the assertiveness factor.

2. Centralization was found negatively related to the overall interaction and assertiveness factors and insignificantly related to the rationality factor (Miller, 1987:23).

Table 5 summarizes the relationship between these factors as researched by Miller. A plus sign (+) indicates a positive correlation; a negative sign (-) indicates a negative correlation; a blank ( ) indicates no correlation.

This research investigated the applicability of the dynamics found by Miller to an Air Force context. To this end, Miller's research design and methodology were replicated to the greatest extent possible given the fiscal and time constraints imposed by the USAF.

Research Maturation

The research maturity of a study is determined by the rigor of the research methodology in terms of scientific method (Schendel and Cool, 1988:27-29). Research maturity is a continuum, depicted in Figure 4, ranging from prescriptive to hypothesis testing studies. Prescriptive

TABLE 5

SUMMARY OF EXPECTED RELATIONSHIPS

Structural Dimensions	Relationships with Strategy Making		
	Rationality	Interaction	Assertiveness
Integration	+	+	+
Formalization	+	+	-
Centralization	( )	-	-

(Miller, 1987:22-24)

studies are the least rigorous, employing few, if any, of the tenets ofthe scientific method. They are basically unsubstantiated research that rely on observation or experience for affirmation. Hypotheses testing, on the other hand, is the most rigorous. This research is oriented towards testing hypotheses, developing causal models, and validating predictive theory (Schendel and Cool, 1988:29). It requires strict adherence to the requirements of data integrity and construct validity. In between lies descriptive research and hypothesis generation. Descriptive research is characterized by creativity, personal insights, and personal judgment. Hypothesis generation research is characterized by careful, accurate description of phenomena.

In terms of research maturity, this study is characterized as hypothesis testing. In its methodology, it must adhere to the rigors that are implied by scientific method in terms of data collection, data analysis, and hypothesis testing.

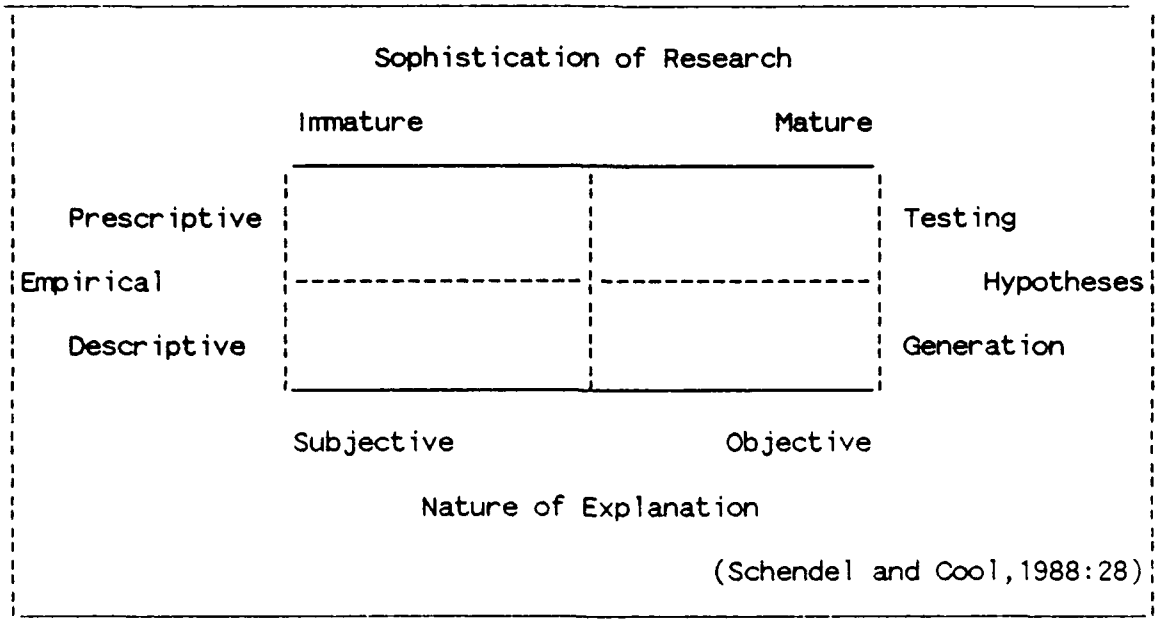


Figure 4. Research Maturation Continuum

Data Collection

Research data was gathered through a mail survey. Surveying ably describes the characteristics of large organizations (Babbie, 1979:346). It is flexible, allowing for empirical research where operational definitions are based on actual observations as well as for experimental designs where a particular operational definition of a concept dictates the means of observation (Babbie, 1979:346). Mail surveys permit data collection from a large number of respondents, who are geographically separated, at a reasonable cost in time and resources (Emory, 1985:158).

Survey Development. The survey used established variables and measures to provide a systematic assessment of organizational structure and strategic decision-making.

The organizational structure variables--centralization, formalization, and integration--were assessed using the scales developed

by Khandwalla (1977), Miller (1983) and the Aston Group studies by Inkson, Pugh and Hickson (1970). Centralization (CENT) was measured by the Aston scales. Formalization was measured using the specialization (SPEC) and formalization (FORMAL) scales of the Aston studies and Khandwalla's CONTROL scales. Integration was measured using Miller's scales for liaison structures (LIASTRUC) and liaison processes (LIASDMG) (Miller and Droge, 1986:559). The two scales were aggregated and reported as the single variable "liaison devices" (LIASDEV).

The strategic decision-making variables--rationality, interaction and assertiveness--were assessed by the analysis scale developed by Miller (1987:32). To assess rationality, the scale measures an organization's level of analysis involved in decision making (ANALY), its future orientation (FUTURE), and its explicitness of strategy (EXPLICIT). To assess interaction, the scale measures an organization's use of consensus versus individual decision making (CONSENS) and the importance of bargaining and discussion for middle and top management in the resolution of problems (BARGAIN). To assess assertiveness, the scale measures an organization's proactiveness (PROACT), and risk taking (RISK).

Survey Reliability. The reliabilities of the survey's scales were established by the original researchers. Khandwalla (1977:659-663) and Miller (1983:778) established the reliability of their scales in accordance with the criteria proposed by Van de Ven and Ferry (1979:78-81). The Aston scales were shown reliable by the authors and in follow-on research (Inkson and others, 1970:324; Child, 1972a:173).

To evaluate the scales' internal consistency for this study, a Cronbach's alpha was computed for each scale. The alpha detects measurement error due to a lack of internal consistency in responses to items within a scale. If the alpha is low for a scale, the items in the index probably are not operational referents of the same construct (Van de Ven and Ferry, 1979:79). However, no standards or guidelines exist on what level of alpha is adequate for evaluating the internal consistency of scales (Van de Ven and Ferry, 1979:79).

The Cronbach's alpha for the formalization (FORMAL) scale was 0.44. This level of alpha draws into question the reliability of the scale. The FORMAL scale was designed for use in inter-organizational studies (Inkson and others, 1970:323). The surveyed USAF logistics organizations, although separated by command lines, are all subject to the requirements of Headquarters Air Force (Hq USAF). Because of Hq USAF directives, the degree of formalization was consistent across all surveyed organizations. There was very little variance in the responses: scale = 0 to 9; mean = 4.3578; standard deviation = 0.4965; probability of normality > 0.9999. Because of this consistency across the surveyed organizations in regard to formalization, the FORMAL scale was not used in the data analysis.

Survey Approval. The survey was approved for distribution by the Air Force Military Personnel Center on 15 May 1990 and assigned USAF Survey Control Number 90-49.

Survey Summaries. A copy of the survey and a cross reference between its questions and the appropriate scale is at Appendix A. Table 6 summarizes the applicable scales for the relationships measured.

TABLE 6

SUMMARY OF MEASUREMENT SCALES

Structural Dimensions	Integration	Formalization	Centralization
	LIASDEV	FORMAL SPEC CONTROL	CENT
Strategy Making Factors			
Rationality:	Analysis Future orientation/planning Explicitness		
Interaction:	Bargaining Consensus versus individual decision making		
Assertiveness:	Proactiveness Risk taking		

Table 7 summarizes the scale reliabilities as reported by Miller (1987:16) and as evaluated for this research.

TABLE 7

SUMMARY OF MEASUREMENT SCALES' RELIABILITIES

Scale	Cronbach's alpha Miller	This Research
Analysis	.74	.71
Future Orientation/Planning	.65	.83
Proactiveness	.67	.81
Liaison Devices	.84	.85
Controls	.78	.69
Formalization	.65	.44
Specialization	.80	.72
Centralization	.82	.80

Testing/Validation

To meet intent of the test-revise-retest cycle, a two phase test of the survey was conducted to establish content validity. In the first phase, the survey was submitted to Air Force Institute of Technology logistics management and organization theory professors (n=10) to ascertain the appropriateness of each item. In the second phase, the survey was submitted to senior logistics managers (n=5) in Air Force Logistics Command and Tactical Air Command headquarters for field testing. Both phases resulted in minor semantic changes to the instrument.

Respondents

The research studied the following major command headquarters (Hq) and air logistics centers (ALC):

1. Hq Air Force Logistics Command (AFLC)
2. Hq Military Airlift Command (MAC)
3. Hq Pacific Air Forces (PACAF)
4. Hq Strategic Air Command (SAC)
5. Hq Tactical Air Command (TAC)
6. Hq United States Air Forces--Europe (USAFE)
7. Oklahoma City Air Logistics Center (OC-ALC)
8. Ogden Air Logistics Center (OO-ALC)
9. San Antonio Air Logistics Center (SA-ALC)
10. Sacramento Air Logistics Center (SM-ALC)
11. Warner-Robins Air Logistics Center (WR-ALC)

These organizations were chosen because of their impact on determining the maintenance concept of currently fielded combat and combat-support

aircraft. The operational commands--MAC, PACAF, SAC, TAC, and USAFE--employ USAF aircraft for actual mission accomplishment. They currently perform the organizational and intermediate levels of aircraft maintenance. AFLC and the ALCs provides logistics support to the operational commands through aircraft engineering services and spare parts provisioning, procurement and distribution. They currently perform the depot level of aircraft maintenance.

The survey was a census of the senior-level logistics managers occupying decision making roles in each of the selected organizations (n=100). Research has shown that senior-level managers are "key process actors" in the implementation of change in an organization (Nutt, 1986:233). The success of innovation has been related to positive advocacy of senior managers (Meyer and Goes, 1988:910).

In the operational commands, the following (and their deputies) were contacted:

1. Deputy Chief of Staff for Logistics (LG)
2. Director of Maintenance Engineering (LGM)
3. Director of Maintenance Procedures (LGQ)
4. Director of Supply (LGS)
5. Director of Transportation (LGT)
6. Deputy Chief of Staff for Air Transportation (TR) (MAC only)

At Headquarters AFLC, the Deputy Chief of Staff for Distribution (DS), the Deputy Chief of Staff for Material Management (MM), the Deputy Chief of Staff for Maintenance (MA), and the Deputy Chief of Staff for Plans (XP) (and their deputies) were contacted. At the ALCs, the Directors of Distribution (DS), Maintenance (MA), and Material Management (MM) and System Program Managers (MM*) for the A-10 (SM-

ALC/MMS), B1-B (OC-ALC/MMB), B-52 (OC-ALC/MMH), C-5 (SA-ALC/MMU), C-17 (SA-ALC/MMA), C-130 (WR-ALC/MMC), C-141 (WR-ALC/MMH), F-4 (OO-ALC/MMS), F-15 (WR-ALC/MMF), F-16 (OO-ALC/MMA), F/FB-111 (SM-ALC/MMK), and C-135 (OC-ALC/MMS) and their deputies were surveyed.

Of the one hundred surveys mailed, 76 were returned, resulting in a better than 75 percent response rate. Of the 76, eight responses were unusable due to incomplete or missing information. Five respondents (one each from AFLC, PACAF, TAC, SA-ALC, and SM-ALC) returned the survey with the demographics information pages removed. Three respondents (one each from OO-ALC, SA-ALC, and WR-ALC) did not answer significant parts of the survey, precluding analysis. Of the 24 surveys not returned, two were from Hq AFLC; two from MAC; four from PACAF; one from SAC; two from USAFE; and thirteen from the ALCs. In the cases of PACAF/LGM and PACAF/LGT, no data was available because of an unusable response for the former and the lack of a response for the latter. The research's analysis was done based on 68 responses (n=68) which represents 68 percent of the population.

Table 8 summarizes the survey's population and respondents.

Data Analysis

In keeping with Miller's model, statistical analysis of the survey data was performed. A perusal of Table 9 is useful for visualizing the data analysis workflow. The results of the data analysis are presented in Chapter IV.

All statistical work was accomplished using the SAS software system for data analysis and the SPSSx software system for reliability analysis.

TABLE 8

SURVEY POPULATION AND RESPONDENTS

Command	Office Symbol	# of persons contacted	# of persons responding
AFLC	DS	2	2
	MA	2	1
	MM	2	1
	XP	2	2*
MAC	LG	2	1
	LGM	2	2
	LGS	2	2
	LGT	1	1
	TR	2	1
PACAF	LG	2	1
	LGM	2	1*
	LGS	2	1
	LGT	1	0
SAC	LG	2	2
	LGM	2	2
	LGQ	1	1
	LGS	2	1
	LGT	1	1
TAC	LG	2	2
	LGM	2	2*
	LGQ	1	1
	LGS	2	2
	LGT	1	1
USAFE	LG	2	1
	LGM	1	1
	LGS	2	2
	LGT	2	1
OC-ALC	MM	2	2
	MA	2	1
	DS	2	1
	MMB	2	1
	MMH	2	1
	MMS	2	1

TABLE 8 (cont)

SURVEY POPULATION AND RESPONDENTS

Command	Office Symbol	# of persons contacted	# of persons responding
OO-ALC	MM	1	1
	MA	2	2*
	DS	2	1
	MMA	2	2
	MMS	2	1
SA-ALC	MM	2	2
	MA	2	2*
	DS	2	1
	MMA	2	2*
	MMU	2	1
SM-ALC	MM	2	2
	MA	2	1
	DS	2	1
	MMK	2	2*
	MMS	2	2
WR-ALC	MM	2	1
	MA	2	2
	DS	2	2
	MMC	2	1
	MMF	2	2
	MMH	2	2*
	TOTALS	100	76
			- 8
			n = 68 usable responses

* denotes unusable responses (Total = 8)

Simple correlation of the survey data was initially accomplished. This provided indications of the "relatedness" of variables to each other. Correlation implies a relationship between two variables or factors; although, high correlation does not imply causality (McClave and Benson, 1988:515).

Principal component analysis followed. It was useful in summarizing the majority of the information contained in a number of variables into aggregated factors that better describe the variables' inherent information (Mulaik, 1972:174; Miller, 1987:17). It analyzed the variables, transforming them into a linearly independent set of component variables that can account for more of the variance in the data than any other linear combination of variables (Harman, 1976:134). Specifically, the first principal component is the linear combination of the original variables that accounts for the maximum of the original variables' total variance; the second principal component, uncorrelated with the first, accounts for the maximum of the residual, or remaining, variance; and so on until the total variance is analyzed. The sum of the variances of the derived components is equal to the sum of the variances of the original variables.

Since the principal components analysis is dependent on the total variance of the original variables, all variable data was standardized prior to analysis.

Although all components must be used to account for all of the variance, in practice, the components that account for the largest percentage of the total variance are retained for further analysis. In this research, two criteria were used for choosing the components for further analysis. The Kaiser criterion holds that components with

TABLE 9

DATA ANALYSIS WORKFLOW

Step 1:	Initial correlation of the organizational structure and decision making variables
Step 2:	Principal Component Analysis
	(a) Correlations matrixed (b) Eigenvalues calculated
Step 3:	Eigenvalues examined
	(a) Apply Kaiser Criterion (b) Examine scree plots (c) Choose "factors" to retain
Step 4:	Orthogonal rotation of retained factors
	(a) Examine factor loadings (b) Rotated factors with loadings greater than +/- 0.5 are used to interpret factors
Step 5:	Factor/Variable correlation to decide interrelationships
Step 6:	Factor/Variable multiple regression to analyze variance

eigenvalues greater than one be retained. Research has shown that the number of eigenvalues greater than one corresponds to the number of common factors that have a positive generalizability in the sense of Cronbach's alpha (Mulaik, 1972:176). The scree test is based on the trend in a plot of the eigenvalues (Harman, 1976:163). Based on observation, it uses a graphical plot of the roots to determine the number of factors to retain. A plot of the eigenvalues typically falls quickly and then straightens out to the last value. The straight portion of the line is the scree. The number of factors is determined by the point where the scree begins; the factors to retain are those

that precede the scree. The initial factor solution was determined after consideration of both criteria.

After determination, the initial factor solution was orthogonally rotated using the Varimax criterion. Orthogonally rotated factors create a factor matrix precludes ambiguities in interpretation by ensuring that the factors are uncorrelated (Harman, 1976:98). Rotated variables with "loadings," or coefficients, greater than 0.5 were used to interpret the factors (Miller, 1987:19).

The derived factors and individual variables were tested through correlation and multiple regression analysis to decide which variables or factors better captured the dynamics between strategic decision making and structure. Again, correlation implies a relationship between two variables or factors; although, high correlation does not imply causality (McClave and Benson, 1988:515). Multiple regression simultaneously controls for the effects of the structural factors on strategy making and provides for the explanation of available the collective variance (Miller, 1987:20). The better models were used to test the hypotheses.

Chapter Summary

This research investigated the relationship between strategic decision-making processes and the organizational structure of major USAF logistics organizations. It sought to establish linkages between the three attributes of strategic decision-making--rationality, interaction, and assertiveness--and the four dimensions of organizational structure --centralization, formalization, and integration. The relationships between the above were adapted from a model proposed by Miller (1987) in "Strategy Making and Structure: Analysis and Implications for

Performance." Research data was gathered through mail surveys. The survey used established variables and measures to provide a systematic assessment of organizational structure and strategic decision making. To check for internal consistency, a Cronbach's alpha was determined for each scale. To meet intent of the test-revise-retest cycle, a two phase test of the survey was conducted to establish content validity. The survey was directed at senior-level logistics managers in selected major USAF logistics organizations. Principal component analysis and orthogonal rotation was used to determine the variables and factors which underlie the dynamics of strategy making and structure. The variables and factors were tested, using correlations and mulciple regressions, to decide which better captured the relationship between the surveyed organizations' decision-making processes and their organizational structures.

IV. Data Analysis

Introduction

Successful implementation of the change in USAF aircraft maintenance concept is dependent upon the adaptability of USAF logistics organizations' structures and strategic decision-making processes. To gain insight into the adaptation process, this study investigated the relationship and interaction between the dimensions of structure and strategic decision making processes of the major USAF logistics organizations.

Research data was gathered through mail surveys directed to senior-level logistics managers. The survey used established variables and measures to provide a systematic assessment of organizational structure and strategic decision making.

This chapter presents the results of the survey data analysis completed in accordance with the research methodology outlined in Chapter III. The methodology explored the interrelationships of the variables. Descriptive statistics and simple correlations between all variables were accomplished to establish initial relationships. Factor analysis followed to allow for data reduction by identifying aggregate variables termed "factors." The derived factors and individual variables were tested in correlation analyses and multiple regressions to decide which better captured the dynamics between organizational strategic decision making and structure. The models that best accounted for the variance were used to test the hypotheses proposed in Chapter I. Table 10 provides a representation of the data analysis workflow.

TABLE 10

DATA ANALYSIS WORKFLOW

Step 1:	Initial correlation of the organizational structure and decision making variables
Step 2:	Principal Component Analysis
	(a) Correlations matrixed (b) Eigenvalues calculated
Step 3:	Eigenvalues examined
	(a) Apply Kaiser Criterion (b) Examine scree plots (c) Choose "factors" to retain
Step 4:	Orthogonal rotation of retained factors
	(a) Examine factor loadings (b) Rotated factors with loadings greater than +/- 0.5 are used to interpret factors
Step 5:	Factor/Variable correlation to decide interrelationships
Step 6:	Factor/Variable multiple regression to analyze variance

Descriptive Statistics

The means, standard deviations, and the probability of normality of the survey variables are presented in Table 11. In considering the means and standard deviations, one should note that the survey responses, except those for the liaison devices, and specialization scales, were answered on a seven-point Likert scale. The liaison devices scale was an aggregation of the liaison structures and liaison processes scales, and ranged from 0 to 14 points. The specialization scale was an aggregation of 11 items, each item valued either 0 or 1.

TABLE 11

MEANS, STANDARD DEVIATIONS, AND NORMALITY

Variables	Means	Std Dev	Probability of Normality*
Strategy Making			
Analysis	3.9449	1.2322	.0166
Future Orientation/ Planning	4.0294	1.3025	.0040
Explicitness of Strategy	4.7206	3.7090	.0001
Consensus vs Individual Decision Making	4.1471	1.7894	.0002
Bargaining	5.2941	1.6487	.0001
Proactiveness	4.2059	1.2930	.0133
Risk taking	3.6324	1.4445	.0001
Structure			
Liaison Devices	10.0440	3.7851	.8848
Controls	4.5625	1.2164	.1215
Specialization	9.4118	1.8058	.0001
Centralization	3.5037	0.6150	.2987

* SAS calculates a probability of normality rather than a p-value.

The variables' means appear to be almost centered on the scales with the exception of liaison devices and specialization. Their means are well above the median, a possible indication that USAF logistics organizations are fairly specialized and employ liaison devices often. Since none of the variables appear to be normally distributed, no assumptions regarding the distribution of the data around the mean can be made. It is important to note that factor analysis requires no particular assumptions about the underlying structure of the variables (Kim, 1975:470). Appendix B contains detailed statistics on each variable, including stem and leaf, box, and normal probability plots.

Factor Analysis

Preparation of Correlation Matrix. The first step in factor analysis involves the calculation of correlations. The correlations of the variables provides some indication of their interrelations. Table 12 presents the correlations among all variables. Among the strategy making variables, correlations of $p<0.001$ appear between the future orientation/planning scale and the analysis and proactiveness scales, between the proactiveness and bargaining scales, and the proactiveness and risk taking scales. Among the structure variables, correlations of $p<0.001$ appear between the liaison devices and controls scales and between the controls and specializations scales. Between the strategy making and structure variables, correlations of $p<0.001$ appear between the liaison devices scale and the analysis, future orientation/planning, and proactiveness scales. Consensus versus individual decision making is negati.ly correlated or uncorrelated to all other variables.

Extraction of Initial Factors. The second step in factor analysis is to explore the data reduction possibilities by constructing a set of new variables on the basis of the interrelations exhibited in the data. The new variables are defined as exact mathematical transformations of the original data. Initial factors are extracted such that one factor is independent from the other or "orthogonal."

Principal components analysis is a relatively straightforward method of transforming a set of variables into a new set of composite variables or principal components that are orthogonal (uncorrelated) to each other. The first component is the best linear combination of variables that can account for more of the variance in the data as a

TABLE 12

CORRELATIONS AMONG ALL VARIABLES*

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Analysis											
2. Future Orientation/Planning	62										
3. Explicitness of Strategy	23	11									
4. Consensus vs Individual Decision Making	-30	-28	2								
5. Bargaining	33	39	-8	-20							
6. Proactiveness	19	36	15	-8	54						
7. Risk taking	23	23	7	-16	22	34					
8. Liaison Devices	51	41	5	-30	31	37	24				
9. Controls	12	23	-3	-3	19	10	22	42			
10. Specialization	20	18	-7	-8	20	25	17	28	19		
11. Centralization	-14	-11	0	-2	1	20	10	14	20	12	

* Coefficients must be greater than .18, .24, and .33, respectively to reach the 0.05, 0.01, and 0.001 levels of significance. Decimal points omitted.

whole than any other linear combination of variables. The second component is the best linear combination that can account for the remaining variance. The process continues until all variance is explained.

To form the initial factor solution, the principal components are evaluated against two criteria: the Kaiser criterion and the scree test. The Kaiser criterion holds that components with eigenvalues greater than one be retained. The scree test is based on the trend in a plot of the eigenvalues. It uses a graphical plot of the factors to determine the number of factors to retain. A plot of the eigenvalues typically falls quickly and then straightens out to the last value. The straight portion of the line is the scree. The number of factors is determined by the point where the scree begins; the factors to retain are those that precede the scree.

Organizational Structure Factors. After analyzing the principal components of the structural variables, two structural factors were extracted. The Kaiser criterion for the eigenvalues (Table 13) suggested that only one factor be considered. However, an examination of the scree plot (Figure 5) showed that the second factor preceded the scree. It was included in the initial factor solution for organizational structure.

Organizational strategy making variables. In the case of the strategy making variables, three factors met Kaiser's criterion (Table 14). However, an examination of the scree plot (Figure 6) showed that third factor was in the scree. Factors one and two were included in the initial factor solution, factor three was not.

TABLE 13

STRUCTURAL VARIABLE LOADINGS AFTER
PRINCIPAL COMPONENTS ANALYSIS

Structural Variables	Structural Factors	
	Factor One	Factor Two
Liaison Devices	.7462	.0965
Controls	.7748	-.0664
Specialization	.6995	.1544
Centralization	.3341	.9884
Eigenvalues	1.7581	.9601
Cumulative Percent of Variance Explained	.4395	.6796

TABLE 14

LOADINGS OF STRATEGY MAKING VARIABLES AFTER
PRINCIPAL COMPONENTS ANALYSIS

Strategy Making Variables	Strategy Making Factors		
	Factor One	Factor Two	Factor Three
Analysis	.7203	.4273	-.2126
Future Orientation/Planning	.7822	.1877	-.1665
Explicitness of Strategy	.2087	.7255	.5525
Consensus vs Individual Decision Making	.4521	-.0905	.5368
Bargaining	.6983	-.4618	.0298
Proactiveness	.6659	-.3540	.4712
Risk Taking	.5155	-.1722	.2351
Eigenvalues	2.5754	1.1207	1.0620
Cumulative Percent of Variance Explained	.3670	.5250	.6797

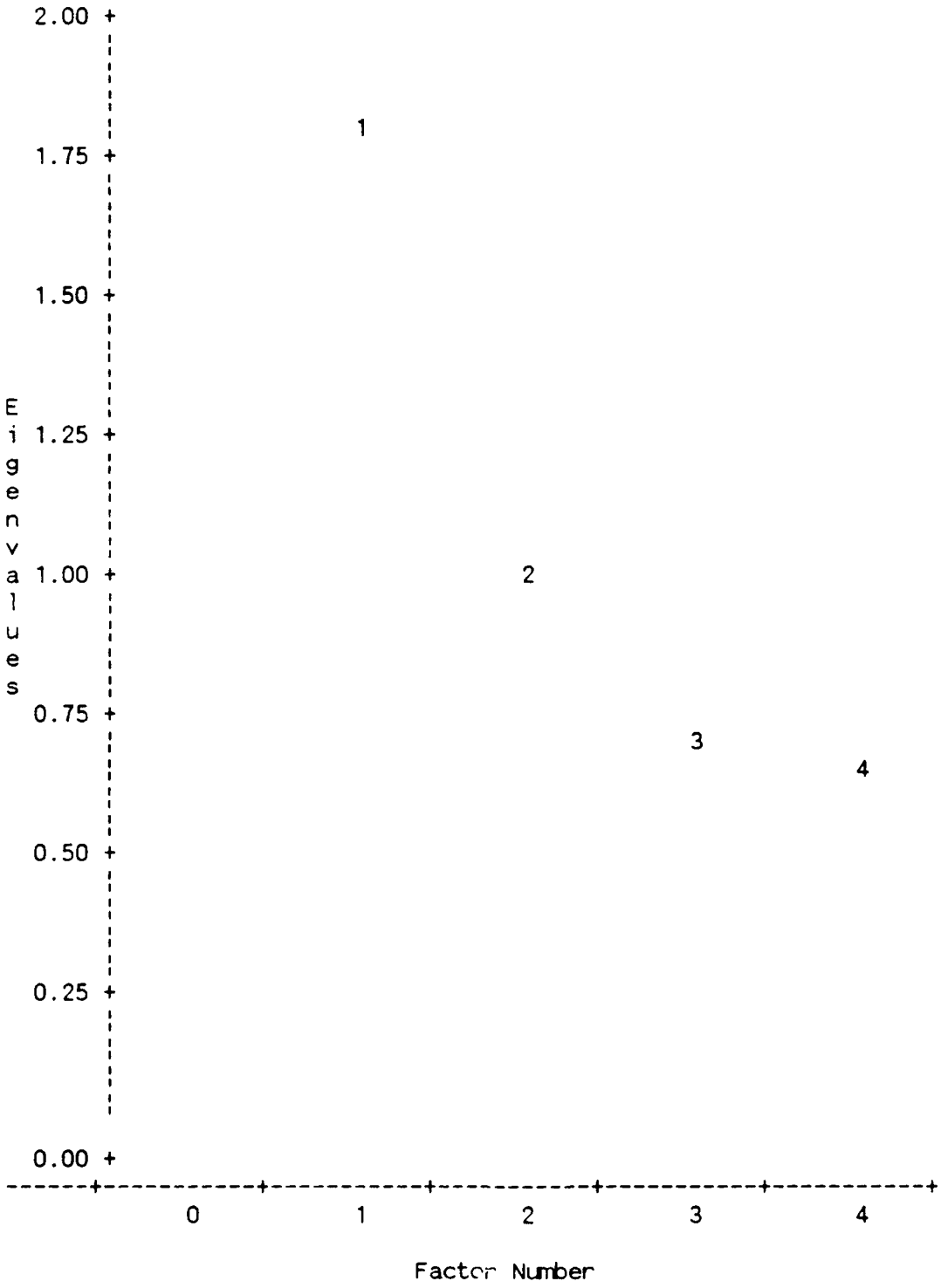


Figure 5. Scree Plot for Organizational Structure Factors

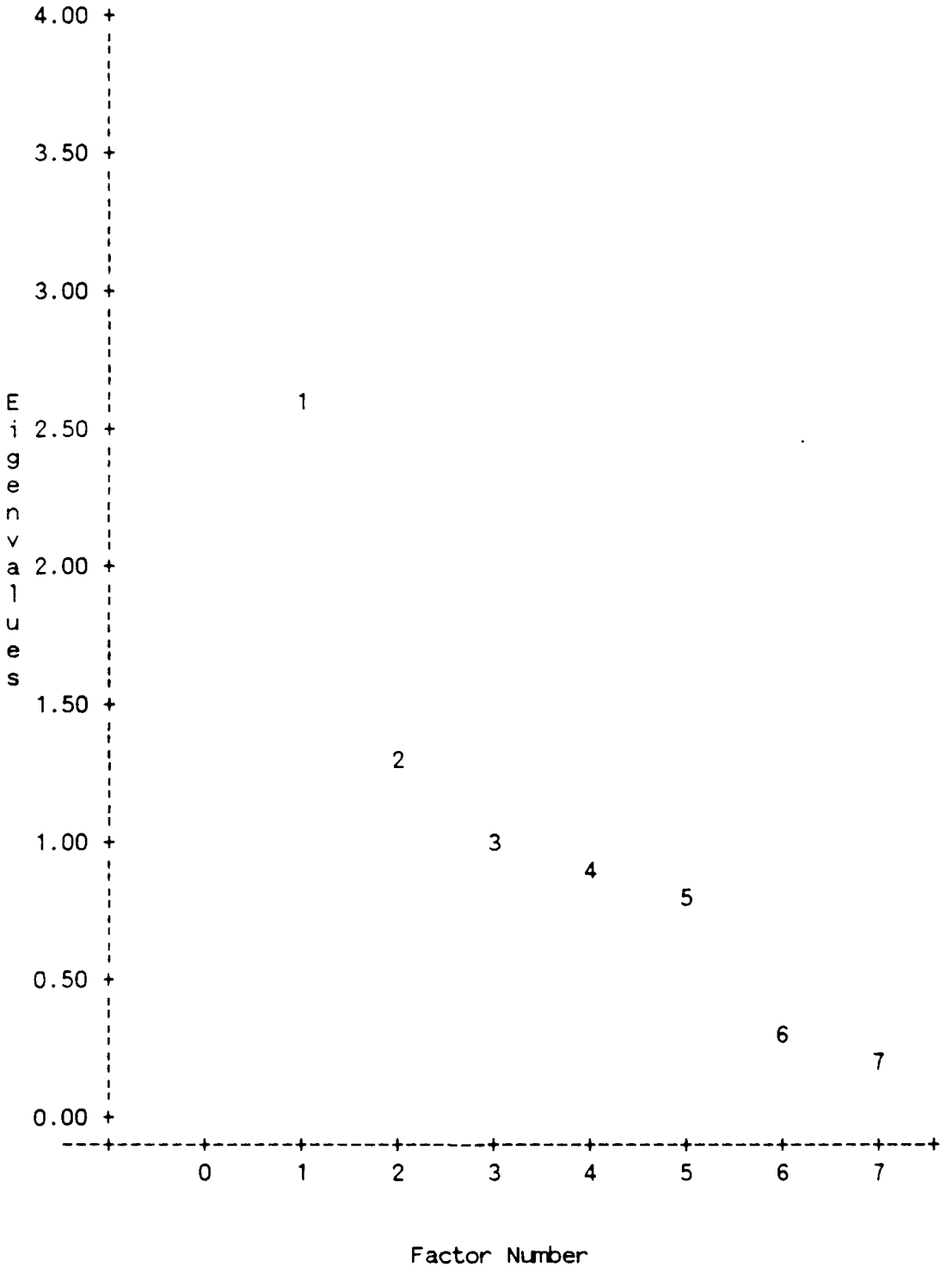


Figure 6. Scree Plot for Organizational Strategy Making Factors

Rotation of Factors into Terminal Factors. Initial factor solutions may or may not give a meaningful patterning of variables (Kim, 1975: 482-483). As pointed out above, initial factors are extracted in order of importance. The first factor tends to be a general factor and loads significantly on every variable. The subsequent factors tend to be bipolar, with half of the variables having positive loadings and the other half negative loadings. Also, the variables tend to decompose into positive and negative factors. These phenomena can be seen Tables 13 and 14. Rotation precludes this. In the rotated solution, each variable should be accounted for by a single significant common factor.

Factors which are rotated orthogonally create a factor matrix that precludes ambiguities in interpretation. It ensures that the factors are uncorrelated.

In this study, the initial factor solutions were orthogonally rotated using Varimax criterion. Rotated variables with "loadings" greater than 0.5 were termed "significant" and were used to interpret the factors.

Organizational Structure Factors. The two retained organizational structure factors were orthogonally rotated. The resulting loadings are detailed in Table 15.

The first structure factor showed significant loadings from the liaison devices variable and the controls and specialization variables of the formalization section of the survey instrument. As in the Miller model, this factor was termed "formal integration."

The second organizational structure factor showed significant loading only on the centralization variable. In keeping with Miller, this factor was termed "centralization."

Plots of the rotation are given at Figures 7 and 8. Figure 7 plots the variables against the factors prior to rotation. Figure 8 plots the variables against the factors after rotation. In reading the plots, it is important to note (1) the relative distance of a variable from the two axes, (2) the direction of a variable in relation to the axes, and (3) the clustering of the variables (Mulaik, 1972:217). In the case of the organizational structure variables, the rotation improved the relationship between the individual structural variables and the "formal integration" factor as discerned from the changes in the loading patterns from Table 13 to Table 15.

TABLE 15

STRUCTURAL VARIABLE LOADINGS AFTER VARIMAX ROTATION*

Structural Variables	Structural Factors	
	Formal Integration	Centralization
Liaison Devices	.7469	.0965
Controls	.8206	-.0664
Specialization	.6829	.1544
Centralization	.0789	.9884

*Underscored loadings indicate variables used to interpret factors.

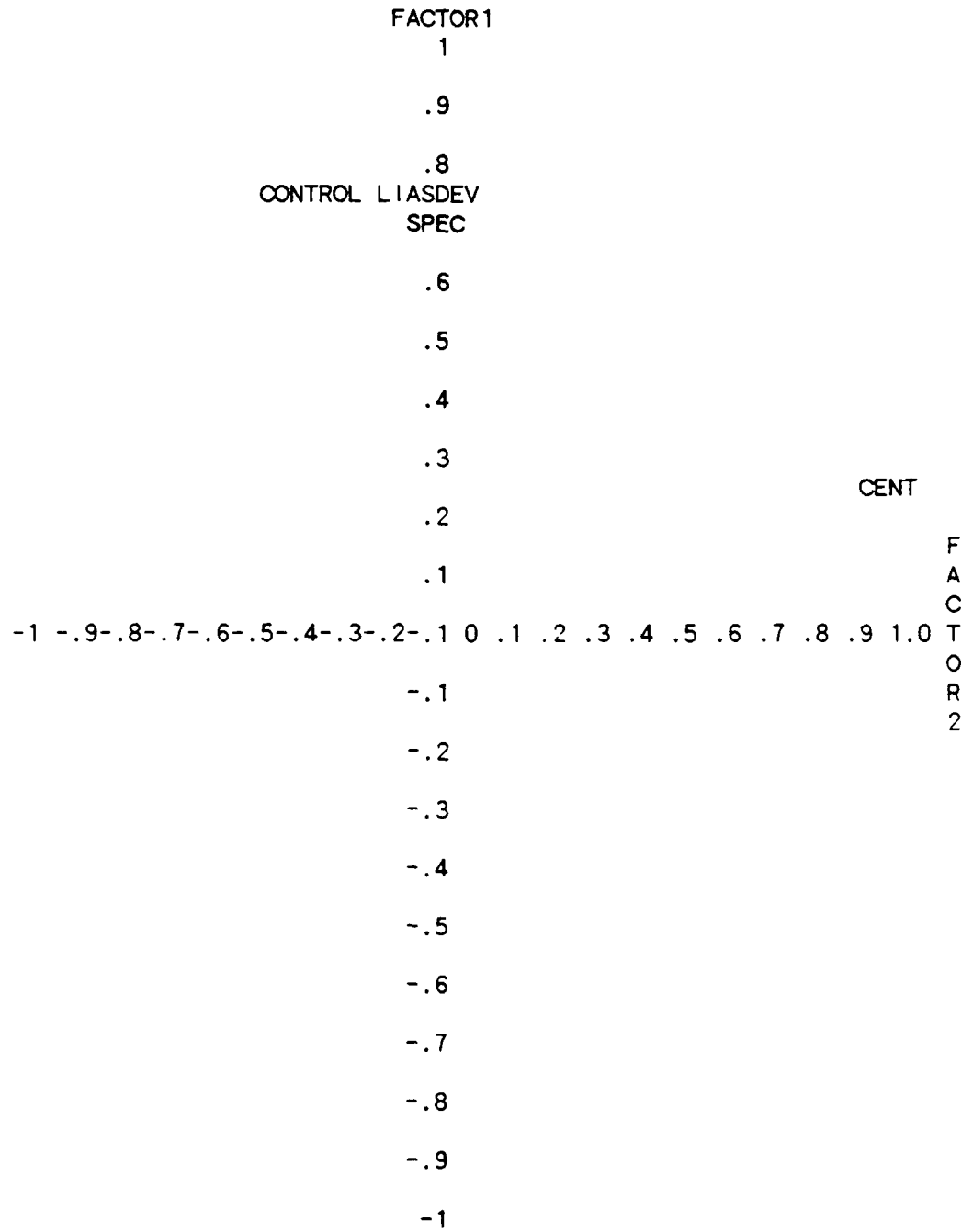


Figure 7. Plot of Organizational Structure Factor Patterns for Factors One and Two after Principal Components Analysis and prior to Varimax Rotation

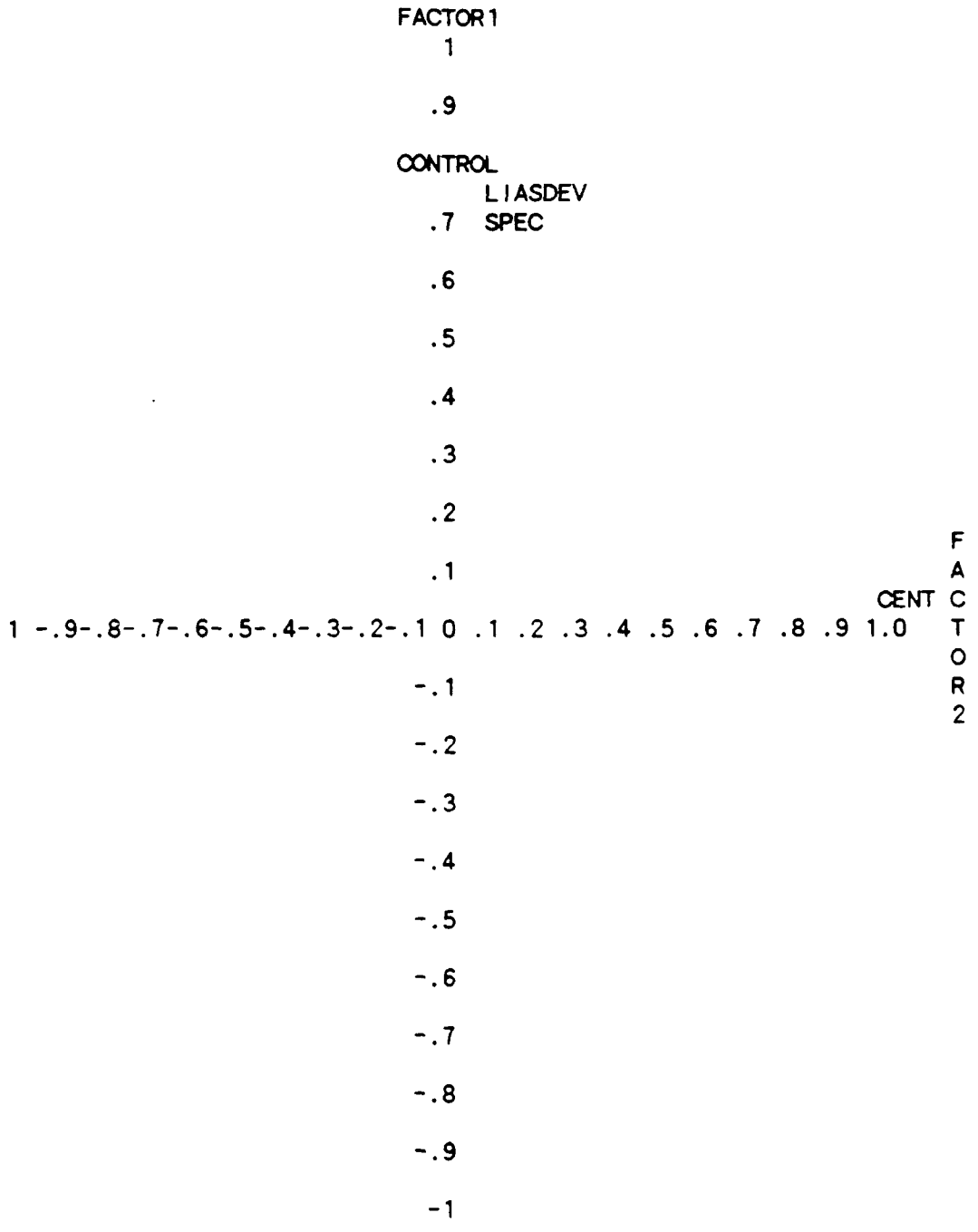


Figure 8. Plot of Organizational Structure Factor Patterns for Factors One and Two after Varimax Rotation

TABLE 16

STRATEGY MAKING VARIABLE LOADINGS AFTER VARIMAX ROTATION*

Strategy Making Variables	Strategy Making Factors: Assertiveness	Rationality
Analysis	.2026	.7803
Future Orientation/Planning	.3919	.7030
Explicitness of Strategy	.0323	.0591
Consensus vs Individual Decision Making	.0135	-.7445
Bargaining	.7562	.2784
Proactiveness	.8809	.0154
Risk taking	.5967	.1327

*Underscored loadings indicate variables used to interpret factors.

Organizational Strategy Making Factors. The rotated loadings on the strategy making variables are presented in Table 16. Plots of the rotation are at Figures 9 and 10.

The first factor corresponds closely to Miller's aggregated factor "assertiveness." It combines proactiveness and risk taking. However, bargaining, considered an interaction variable by Miller (1987:10), loaded heavily on this factor as well. This factor was referenced as "assertiveness."

The second factor is similar to Miller's aggregated factor "rationality." It includes analysis and future orientation and planning. However, explicitness of strategy which was expected to load on this factor proved insignificant. On the other hand, consensus versus individual decision making, again considered an interactive variable by Miller (1987:10), loaded on this factor. This factor was termed "rationality."

The loadings showed a marked change due to the rotation. An examination of Table 14 and Table 16 showed major changes in the loadings. After principal components analysis, factor one had five major loadings from the seven variables, factor two had one major loading. After rotation, factor one and factor two both had three major loadings. The rotation allowed for better interpretation of the factors.

Correlations and Multiple Regressions of Structural Variables and Factors with Strategy Making Factors

The organizational structure and strategy making factors, and their individual variables, were tested through correlation and multiple regression analysis to decide which best captured the dynamics between structure and strategic decision making. Again, correlation implies a relationship between two variables or factors, but not causality (McClave and Benson, 1988:515). The multiple regressions simultaneously control for the effects of the dependent variables on the independent variables and makes the collective variance explainable (Miller, 1987:20). The models that best explained the variance were used to test the hypotheses.

Tables 17 and 18 detail the correlations between the structural and strategy making variables and factors. The structural variable "liaison devices" had correlations with p-values less than 0.001 with both strategy making factors. The other structural variables had correlations to the strategy making factors with p-values greater than 0.01. The structural factor "formal integration" had correlations with

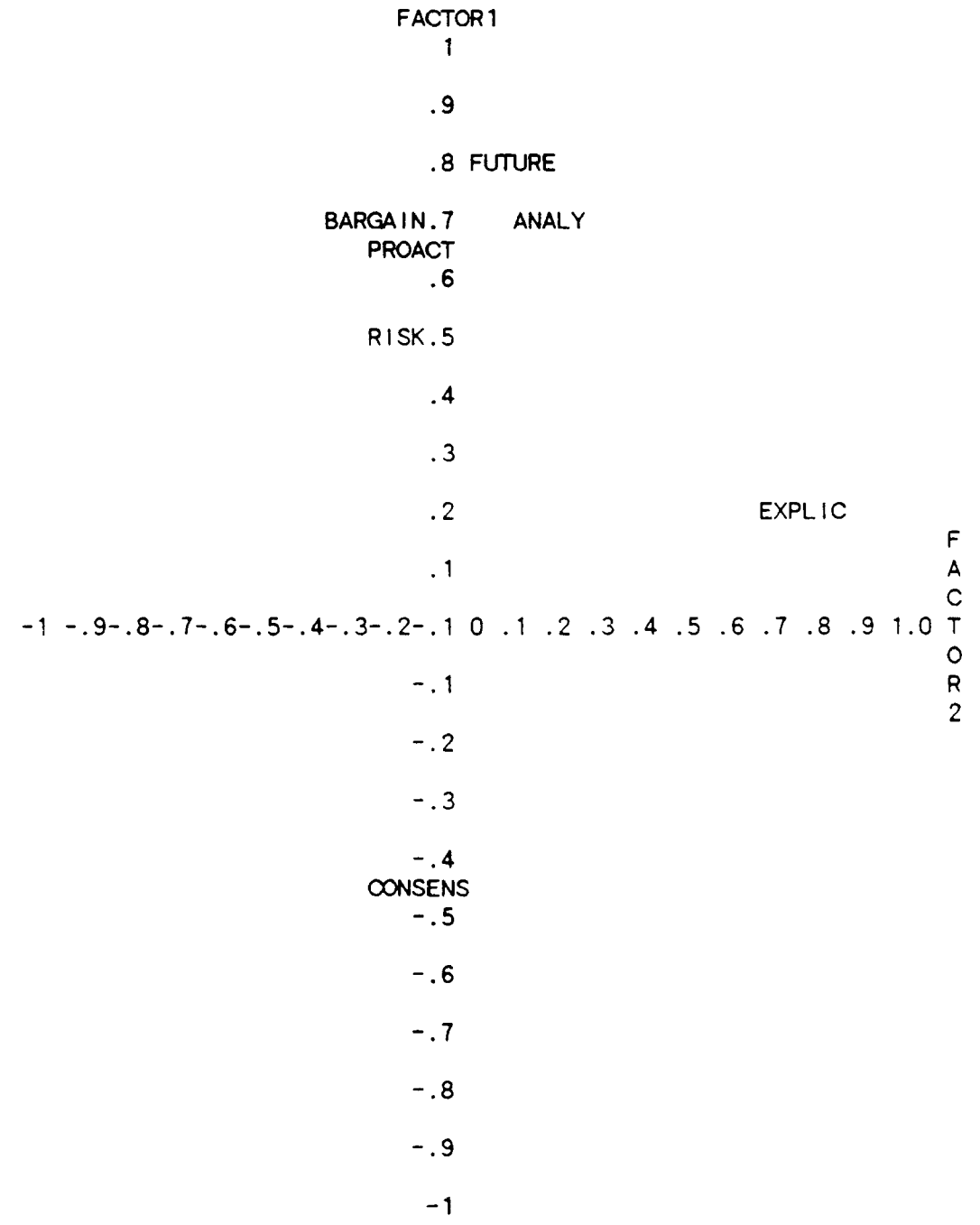


Figure 9. Plot of Organizational Strategy Making Factor Patterns for Factors One and Two after Principal Components Analysis and prior to Varimax Rotation

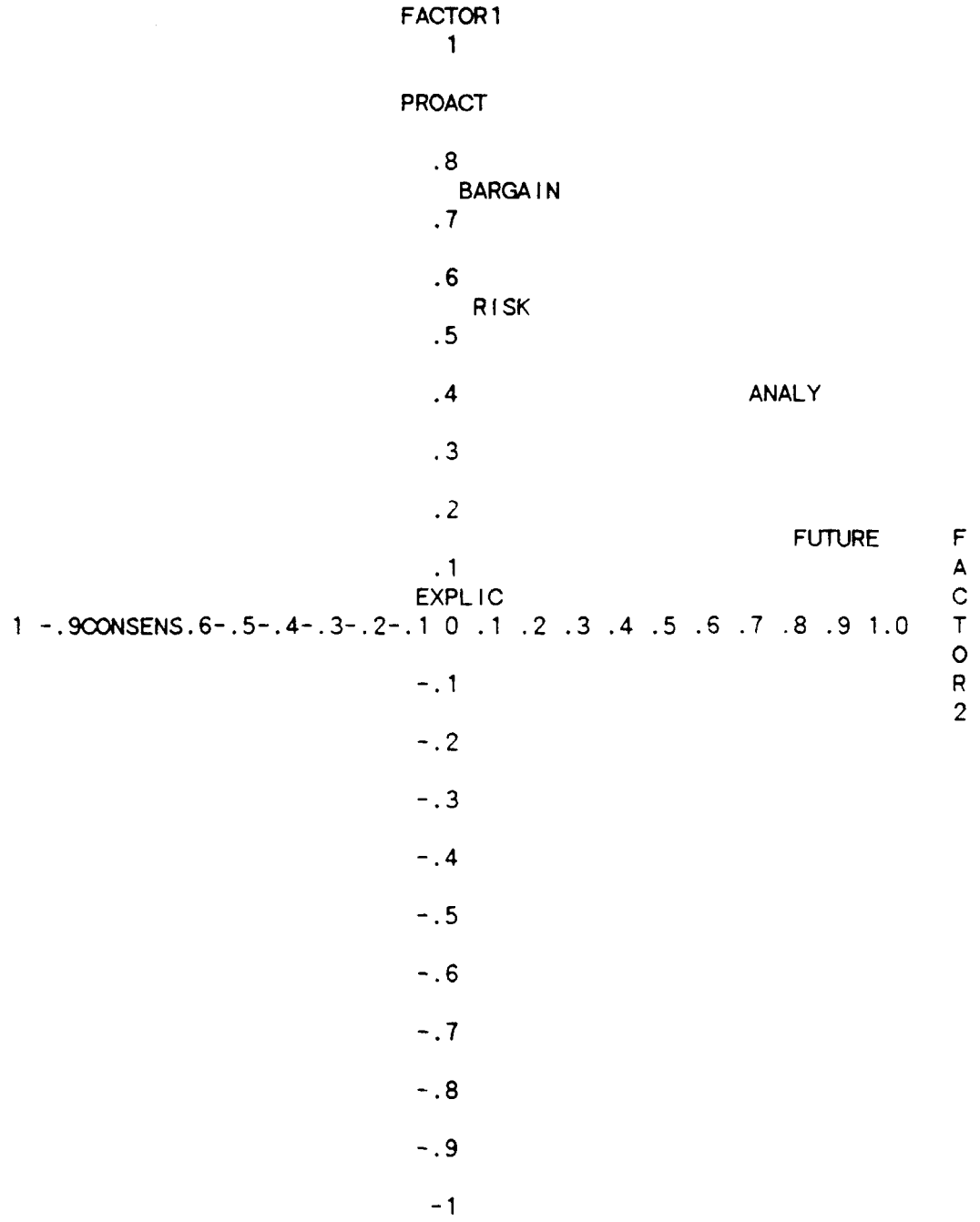


Figure 10. Plot of Organizational Strategy Making Factor Patterns for Factors One and Two after Varimax Rotation

p-values less than 0.01 with the strategy making variables except "explicitness of strategy" and "risk taking."

"Formal integration" showed correlations to both strategy making factors with a p-value less than 0.001. Centralization which served as both a variable and a factor correlated poorly with both strategy making factors and variables.

Table 19 details multiple regression analyses of models regressing the strategy making factors and individual variables against the structural factors. The regressions allowed for the control of the individual effects of the structural factors on strategy making while reporting the collective variance explained.

In the regressions against formal integration, the models based on the strategy making factors fared better than the models based on the individual strategy making variables in explaining the variance in the data as measured by F-values. In the regressions against centralization, both the factor and variable centralization models had poor F-values.

Table 20 presents the multiple regression analyses of models regressing the structural factors and individual variables against the strategy making factors. In the regressions against assertiveness, the models based on the structural factors fared minimally better than the models based on the individual structural variables in explaining the variance in the data as measured by F-values. In the regressions against rationality, both the factor and variable centralization models had poor F-values.

TABLE 17

PEARSON CORRELATIONS AND p-VALUES OF
STRUCTURAL VARIABLES AND FACTORS WITH STRATEGY MAKING FACTORS*

Structural Variables and Factors	Strategy Making Factors	
	Assertiveness	Rationality
Variables		
Controls	.2293	.2004
	(.06)	(.1014)
Specialization	.2747	.2164
	(.0234)	(.0764)
Liaison Devices	.3998	.4823
	(.0008)	(.0001)
Factors		
Centralization	.1312	-.1359
	(.2862)	(.2693)
Formal Integration	.4140	.4178
	(.0005)	(.0004)

* p-Values shown in parentheses.

TABLE 18

PEARSON CORRELATIONS AND p-VALUES OF
STRATEGY MAKING VARIABLES AND FACTORS WITH STRUCTURAL FACTORS*

Strategy Making Variables and Factors	Structural Factors	
	Formal	Integration / Centralization
Variables		
Analysis	.3668	-.1357
	(.0023)	(.2697)
Future Orientation/Planning	.3836	-.1092
	(.0014)	(.3753)
Explicitness of Strategy	-.0239	-.0069
	(.8480)	(.9554)
Consensus vs Individual Decision Making	-.3249	-.0069
	(.8480)	(.8124)
Bargaining	.3232	.0192
	(.0076)	(.8768)
Proactiveness	.3474	.2000
	(.0040)	(.1020)
Risk Taking	.2782	.1023
	(.0226)	(.4063)
Factors		
Assertiveness	.4140	.1312
	(.0005)	(.2862)
Rationality	.4178	-.1359
	(.0004)	(.2693)

* p-Values shown in parentheses.

TABLE 19

MULTIPLE REGRESSIONS OF STRATEGY MAKING FACTORS AND VARIABLES ON STRUCTURAL FACTORS*

Independent Variables: Strategy Making Factors and Variables
Dependent Variables: Structural Factors

Strategy Making Factors & Variables	Structural Factors Standardized Regression Coefficients: Formal Integration	Centralization
Factors		
Assertiveness	.2862	.2304
	(.0196)	(.0845)
Rationality	.2935	-.2495
	(.0171)	(.0629)
	F = 10.238	F = 2.336
	Model p_2 = .0001	Model p_2 = .2424
	Adjusted R^2 = .2426	Adjusted R^2 = .0680
Variables		
Analysis	.1980	-.0952
	(.1857)	(.5423)
Future orientation/planning	.1058	-.1719
	(.3459)	(.3256)
Explicitness of Strategy	-.4585	-.0313
	(.0857)	(.8134)
Consensus versus Individual Decision Making	-.1967	-.0617
	(.0986)	(.6406)
Bargaining	.0175	-.0660
	(.5660)	(.7525)
Proactiveness	.2318	.2600
	(.2227)	(.1070)
Risk taking	.0974	.0820
	(.3136)	(.4904)
	F = 3.511	F = 1.415
	Model p_2 = .0032	Model p_2 = .3082
	Adjusted R^2 = .2103	Adjusted R^2 = .0063

* Individual p-Values shown in parentheses.

TABLE 20

MULTIPLE REGRESSIONS OF STRUCTURAL FACTORS AND VARIABLES ON STRATEGY MAKING FACTORS*

Independent Variables: Structural Factors and Variables
Dependent Variables: Strategy Making Factors

Structural Factors & Variables	Strategy Making Factors Standardized Regression Coefficients Assertiveness	Rationality
Factors		
Formal Integration	.4069	.1851
	(.0008)	(.1403)
Centralization	.0622	-.1820
	(.5962)	(.1503)
	F = 6.789	F = 1.875
	Model p_2 = .0021	Model p_2 = .1617
	Adjusted R^2 = .1426	Adjusted R^2 = .0258
Variables		
Specialization	.1733	.0056
	(.1699)	(.9667)
Control	.0242	-.0373
	(.8536)	(.7892)
Liaison Devices	.3366	.2719
	(.0111)	(.0516)
Centralization	.0550	-.1882
	(.6412)	(.1376)
	F = 3.743	F = 1.489
	Model p_2 = .0086	Model p_2 = .2165
	Adjusted R^2 = .1426	Adjusted R^2 = .0288

* Individual p-Values shown in parentheses.

Chapter Summary

Successful implementation of the change in USAF aircraft maintenance concept is dependent upon the adaptability of USAF logistics organizations' structures and strategic decision-making processes. To gain insight into the adaptation process, this study surveyed senior logisticians in major USAF logistics organizations to ascertain the relationship and interaction between the dimensions of structure and strategic decision making processes.

The analysis of the survey data resulted in the derivation of two strategy making factors, termed assertiveness and rationality, and two structure factors, termed formal integration and centralization. The four factors were derived through principal components analysis and orthogonal rotation of the initial factors. Using correlation and multiple regression analysis, models based on the four factors were tested against models based the original variables. The models that best explain the variance were used to test the hypotheses in Chapter V.

V. Research Summary, Hypotheses Testing, and Conclusions

Introduction

This research studied the relationship between the organizational structure and strategy making processes of major USAF logistics organizations. The implementation of a strategic change provides a scenario for investigating the relationship between an organization's structure and strategic decision-making processes (Zaltman and others, 1973:121). This study used the initiative to change the maintenance concept for most USAF aircraft as the context to investigate the relationship between organizational structure and strategic decision making. This chapter summarizes the path the research followed to produce reliable data regarding the organizational structure and strategic decision making process. It reports the results and conclusions from the testing of the hypotheses proposed in Chapter I. The chapter concludes with a discussion of other findings and the implications.

Research Summary

In the literature review (Chapter II), organization structure was characterized by three dimensions--centralization, formalization, and integration (Burns and Stalker, 1968; Child, 1972b; Hage and Aiken, 1970; Pugh and others, 1969; Zaltman and others, 1973; Lawrence and Lorsch, 1967; Mintzberg, 1989; Galbraith, 1973). Strategic decision-making was characterized by three attributes--rationality, integration, and assertiveness (Thompson, 1967; Cyert and March, 1963; Miles and Snow, 1978).

Miller proposed a model where linkages were established between the attributes of strategic decision making and the dimensions of organizational structure. In his survey of 97 small commercial firms, he noted the following relationships:

1. After combining the formalization and integration variables into the aggregated variable "formal integration," Miller found the formal integration, especially the use of liaison devices, related significantly to the rationality and interaction factors of strategy making (Miller, 1987:22). Formal integration was found not to relate significantly to the assertiveness factor.

2. Centralization was negatively related to the overall interaction and assertiveness factors and insignificantly related to the rationality factor (Miller, 1987:23).

3. Complexity proved insignificantly related to any of the strategic decision making factors (Miller, 1987:23). Miller (1987) proposed a model linking the attributes of strategic decision making with the dimensions of organizational structure. Table 21 summarizes the relationships between these factors.

Research investigating the relationships between organizational structure and strategic decision-making has primarily focused on model-building and the establishment of theoretical constructs. This study adapted an established model to the investigation of the relationship between the strategic decision-making processes and the organizational structure of USAF logistics organizations.

Senior Air Force logisticians were surveyed on the decision making process their organization pursued in implementing the change in

aircraft maintenance concept and on the resultant structure of their organizations. A copy of the survey is at Appendix A.

The survey data was analyzed using factor analysis. Given a set of variables, factor analysis permitted the researcher to detect underlying patterns of relationships by rearranging or reducing data to a smaller set of "factors" or "components" (Harman, 1976:4). Table 22 depicts the factor analysis process.

The survey data formed into two organizational structure factors termed "formal integration" and "centralization." Formal integration was the aggregation of the organizational structure attributes "liaison devices," "controls," and "specialization," which characterize the formalization and integration dimensions of organizationalstructure. Centralization was derived from the attribute "centralization" which describes the centralization dimension. The data also formed into two strategy making factors termed "assertiveness" and "rationality." Assertiveness was an aggregation of the organizational strategy making variables "bargaining," "proactiveness," and "risk taking," which denote the organizational strategy making attributes of assertiveness and interaction. Rationality was derived from the variables "analysis," "future orientation/planning," and "consensus versus individual decision making" which characterize the rationality and interaction attributes. Tables 23 and 24 illustrate the relationships between each factor and its component variables.

The organizational structure and strategic decision making variables and factors were tested in correlation and multiple regression analyses to decide which best captured the dynamics between structure and strategic decision making.

TABLE 21

SUMMARY OF EXPECTED RELATIONSHIPS*

Structural Dimensions	Relationships with Strategy Making		
	Rationality	Interaction	Assertiveness
Integration	+	+	+
Formalization	+	+	-
Centralization	( )	-	-

* A plus (+) indicates a positive correlation; a negative (-) indicates a negative correlation; a blank ( ) indicates no correlation.

(Miller, 1987:23-24)

TABLE 22

FACTOR ANALYSIS PROCESS

Step 1:	Initial correlation of the organizational structure and decision making variables
Step 2:	Extraction of initial factors
	(a) Correlations matrixed (b) Eigenvalues calculated (c) Choose "factors" to retain
Step 3:	Rotation of initial factors to terminal factors
	(a) Examine factor loadings (b) Rotated factors with loadings greater than +/- 0.5 used to interpret factors

TABLE 23

STRUCTURAL FACTORS WITH STRUCTURAL VARIABLES AND LOADINGS

Structural Variables	Structural Factors: Formal Integration	Structural Factors: Centralization
Liaison Devices	.7469	.0965
Controls	.8206	-.0664
Specialization	.6829	.1544
Centralization	.0789	.9884

*Underscored loadings indicate variables used to interpret factors.

TABLE 24

STRATEGY MAKING FACTORS WITH STRATEGY MAKING VARIABLES AND LOADINGS

Strategy Making Variables	Strategy Making Factors: Assertiveness	Strategy Making Factors: Rationality
Analysis	.2026	.7803
Future Orientation/Planning	.3919	.7030
Explicitness of Strategy	.0323	.0591
Consensus vs Individual Decision Making	.0135	-.7445
Bargaining	.7562	.2784
Proactiveness	.8809	.0154
Risk taking	.5967	.1327

*Underscored loadings indicate variables used to interpret factors.

Hypothesis Testing and Conclusions

Hypothesis 1a. Integration will be positively associated with rationality and interaction (Miller, 1987:23).

Hypothesis 2a. Formalization will be positively associated with rationality and interaction (Miller, 1987:23).

Hypotheses 1a and 2a were tested using correlational and regression analyses of the structural factor "formal integration" with the decision making factor "rationality." As noted above, the rationality factor included the interaction attribute "consensus versus individual decision making." In Table 25, the correlational analysis shows that the formal integration factor was significantly related to the rationality factor of decision making ($p < .0004$). In Table 26, the regression analysis shows the rationality factor accounts for significant variance ($p < 0.02$). Examination of the means and standard deviations of the variables that compose the factors (Table 27) showed the means above the mid-points of their respective scales, especially liaison devices (10.044 on a 0 to 14 point scale) and specialization (9.4118 on a 0 to 11 point scale).

In this research, the formal integration factor was shown to be related to rationality. Thus, hypotheses 1a and 2a were supported. This result was not surprising. Formalization specifies the extent to which an organization uses rules and procedures to prescribe behavior. It specifies how, where, and by whom tasks are to be performed (Frederickson, 1986:283). Formal documentation includes written rules and procedures, job descriptions, regulations, and policy manuals (Daft and Steers, 1986:219). Integration describes the extent to which

liaison devices, such as task forces and committees, are used to foster collaboration among units within an organization (Lawrence and Lorsch, 1967:11; Mintzberg, 1979:178).

Rationality is considered "synoptic" or "bounded." The synoptic view suggests that rationality is the process by which an organization defines a problem, defines expectations, develops alternative solutions, and provides a course of action after a decision is reached. During the strategic decision-making process, an organization engages in careful analysis by systematically scanning its environment for problems and opportunities and methodically planning and articulating unified strategies (Miller, 1987:8). In contrast, the bounded view contends that during the strategic decision-making process, an organization is subject to bounded rationality where people have limits to how rational they can be. Instead, decision makers do little analysis, emphasize satisficing, and formulate strategy according to a disjointed process (Simon, 1987:13-16).

Conclusion: USAF logistics organizations can be characterized as formal and integrated entities that pursue rational decision making. These organizations use formal controls and budgets and employ specialists to perform specific jobs. Through their numerous analytical and coordinating activities, they gather information for use in strategic decision making. The formalization and specialization aspects of USAF logistics organizational structure highlight problems and opportunities that promote further analysis, coordination, and, often, change. USAF logistics organizations make use of liaison devices, such as task forces and committees. These provide a forum for discussions

among managers that can generate novel ideas through the participation of managers with different backgrounds. This gives rise to a critical exchange of ideas and information that promotes further analysis.

TABLE 25

CORRELATIONS BETWEEN STRUCTURAL AND STRATEGY MAKING FACTORS

Structural Factors	Strategy Making Factors	
	Assertiveness	Rationality
Formal Integration	.4140 (.0005)	.4178 (.0004)
Centralization	.1312 (.2862)	-.1359 (.2693)

* p-Values shown in parentheses.

TABLE 26

MULTIPLE REGRESSIONS OF STRATEGY MAKING FACTORS ON STRUCTURAL FACTORS

Independent Variable: Strategy Making Factors Dependent Variable: Structure Factors		
Strategy Making Factors	Structural Factors	
	Formal Integration	Centralization
Assertiveness	.2862 (.0196)	.2304 (.0845)
Rationality	.2935 (.0171)	-.2495 (.0629)
	F = 10.238 p = .0001 R^2 = .2426	F = 2.336 p = .2424 R^2 = .0680

*p-Values shown in parentheses.

TABLE 27

MEANS AND STANDARD DEVIATIONS

Factors and Variables	Means	Std Dev	Miller's (1987) Means
Rationality			
Analysis	3.9449	1.2322	4.12
Future Orientation/ Planning	4.0294	1.3025	4.29
Consensus vs Individual Decision Making	4.1471	1.7894	3.25
Assertiveness			
Bargaining	5.2941	1.6487	2.62
Proactiveness	4.2059	1.2930	4.89
Risk taking	3.6324	1.4445	3.91
Formal Integration			
Liaison Devices	10.0440	3.7851	5.67
Controls	4.5625	1.2164	4.85
Specialization	9.4118	1.8058	4.85
Centralization			
Centralization	3.5037	0.6150	3.01

Hypothesis 1b. Integration will be insignificantly associated with assertiveness (Miller, 1987,23).

Hypothesis 2b. Formalization will be insignificantly associated with assertiveness (Miller, 1987:23).

Hypotheses 1b and 2b were tested using correlational and regression analyses. The structural factor "formal integration" proved related to the decision making factor "assertiveness." In Table 25, the correlational analysis shows that the formal integration factor was significantly related to the assertiveness factor of decision making ($p < .0005$). In Table 26, the regression analysis shows that the rationality factor accounts for significant variance ($p < 0.02$). Table

18 (p. 76) indicates the three individual strategy making variables that loaded on assertiveness are correlated to formal integration ($p < .02$).

In this research, formalization and integration were shown to have some relationship to assertiveness. Thus, hypotheses 1b and 2b were not supported.

Assertiveness is the willingness of an organization to consider and implement ideas, formulas, or programs that the individuals involved perceive as new (Zaltman and others, 1973:7). An organization "asserts" itself when a given program of activity no longer meets performance criteria, requiring a new direction (March and Simon, 1958:172). Assertiveness is more prevalent in uncertain environments rather than stable environments (Mintzberg, 1979:270-272). Assertiveness is measured in terms of the levels of risk taking and the reactiveness or proactiveness that an organization will take in its strategic decision-making processes (Miller, 1987:8). As a rationale for hypotheses 1b and 2b, Miller asserts that an organization's environment rather than its structure has a closer relationship to proactiveness and risk taking, the composite variables of the assertiveness factor of the strategy making processes of an organization (1987:23).

In the case of USAF logistics organizations, the positive correlation might be a matter of "congruence," where "the basic alignment mechanism is 'strategy,' and the internal arrangements are 'organizational structure' and 'management processes'" (Miles and Snow, 1984:11). A consistency among practices, structure, and people is required to make them effective.

Similar to the idea of "congruence," Thompson wrote the twin tasks of administration are to provide needful coordination within the

organization and adjustment to circumstances around it (1967:67). It is the framework for the stable coordination of basic work activities or the "technical core" of an organization. Administration is also the means for regulating transactions between the technical core and the environment. It serves to buffer the technical core from outside shocks. USAF logistics organizations exist in an uncertain environment. If they have been successfully meeting the tasks of providing internal stability and buffering the environment, they could assume a proactive, assertive stance that anticipates change.

Miles and Snow (1978) identified an archetype of organizational adaption applicable to USAF logistics organizations. "Analyzers" are organizations which operate in two types of environmental domains, one relatively stable, the other changing (Miles and Snow, 1978:29). In the organization's more turbulent areas, top managers watch their competitors closely for new ideas, and they rapidly adopt those which appear to be the most promising. Miles and Snow (1978) contended that "the perceptions and choices of the dominant coalition of managers" strongly influence both the internal structure of the organization and the assertiveness with which an organization positions itself in its environment. This implies that liaison devices and bargaining processes need to exist to promote this coalition. The organizational structure variable "liaison devices" had the greatest correlation with assertiveness. Liaison devices give rise to a critical exchange of ideas and information (Lawrence and Lorsch, 1967:52). The strategy making variable "bargaining" loaded heavily on the assertiveness factor. Cyert and March contended the goals of an organization are from where

"the process of adjustment to experience by which coalition agreements are altered in response to environmental changes" (1963:29).

Conclusion: This research asserted the structural dimensions of formalization and integration were positively related to the strategy making attribute of assertiveness in USAF logistics organizations. This supports the arguments in the literature that organizations are constructed out of mutually reinforcing rather than independent elements.

Hypothesis 3. Centralization of power for making decisions will be negatively associated with interaction and assertiveness (Miller, 1987:23).

Centralization appeared to relate insignificantly to either rationality or assertiveness. From the data analysis of the strategy making factors, Tables 24 and 25 show little relationship between the factors whether centralization is regressed against formal integration or vice versa. Table 18 (p. 76) suggests no correlations between centralization and the individual strategy making variables. Table 12 (p. 61) indicates the organization structure variable "centralization" had little correlation to any other structural or strategy making variables. Hypothesis 3 was not supported.

The level of centralization was consistent across USAF logistics organizations. Table 27 shows that the centralization measurement scale had a mean of 3.5037 on a seven-point Likert scale and a tight standard deviation of 0.6150. Despite the small variance, the measurement scale demonstrated internal validity with a Cronbach's alpha of 0.80. Because of the consistency, there was little variance to be explained across the

other variables. Therefore, little discrimination could be made on the impact of strategy making on structure. The question to be asked is "Why the consistency?"

Centralization refers to the degree to which decision making and evaluating activities are concentrated. The higher the level in the organization decisions are made and the less participation that exists in decision-making, the greater the centralization (Zaltman and other, 1973:161). This definition is applicable when the organization has charge of its "concentration of authority." The Aston Group found the degree of dependence upon other organizations dictated much of an organization's structure (Pugh and others, 1969:395).

Mintzberg proposed the "diversified organization" (1989:155-172). Such an organization's structure is typified by divisions loosely coupled together under a central administrative headquarters. The divisions run their business autonomously but subject themselves to the inputs of the headquarters. Generally, a performance control system standardizes their outputs. The headquarters manages "corporate" strategy with the divisions managing individual strategies.

The extension of the diversified organization archetype to the Air Force context is plausible. Headquarters Air Force performs the corporate headquarters role. The major commands serve as divisions, each providing specialized services, be it strategic airlift, logistics support, or strategic/tactical air interdiction. The performance control systems would be comparable to the requirements planning, resource planning, and capability planning systems in use in the USAF. Each major command pursues its strategies but within the bounds drawn by Hq Air Force.

Conclusion: The research supported the assertion that the degree of centralization is not related to the strategic decision making process at the major command level. The lack of correlation with any of the measured variables suggests that centralization is influenced by factors external to the organization. The diversified organization archetype might provide some explanation for the insignificant relationship between centralization and the strategy making variables. The degree of centralization in USAF logistics organizations might be dictated by factors at higher levels of Air Force organization.

Summary of hypotheses. The hypotheses were tested using correlation and multiple regression analyses of both the derived factors and individual variables.

Hypotheses 1a and 2a were tested together. The data empirically supported that a positive relationship existed between the structural dimensions of formalization and integration and the strategic decision making attributes of rationality and interaction. USAF logistics organizations can be characterized as formal and integrated entities that pursue rational decision making.

Hypotheses 1b and 2b were not supported by the data. Rather than being insignificantly related, the structural factor "formal integration" proved to be positively related to the decision making factor "assertiveness." In the case of USAF logistics organizations, the positive correlation might be a matter of "congruence" between strategy and organizational structure.

Hypothesis 3 was not supported by the data. Centralization appeared to relate insignificantly to both rationality and

assertiveness. The degree of centralization was consistent across the USAF logistics organizations. Mintzberg's "diversified organization" (1989:155-172) provides some explanation for the consistency. The degree of centralization at the major command level appears not to be subject to its strategic decision making process. The lack of correlation with any of the measured variables suggests that centralization is influenced by factors external to the organization.

Table 28 summarizes the relationships between organizational structure and strategic decision making borne out by this research.

TABLE 28

SUMMARY OF THE RELATIONSHIPS BETWEEN
ORGANIZATIONAL STRUCTURE AND STRATEGIC DECISION MAKING

Structural Dimensions	Relationships with Strategy Making	
	Rationality	Assertiveness
Integration	+	+
Formalization	+	-
Centralization	( )	( )

* A plus (+) indicates a positive correlation; a negative (-) indicates a negative correlation; a blank ( ) indicates no correlation.

Other Findings and Implications

Other findings and implications fall into two categories: academic and organizational. The academic findings address the successes and shortfalls of the research methodology. Questions raised during the research are also given. The organization findings discuss insights into Air Force logistics organizations found during the research.

Academic Findings.

Use of established measurement scales. The Aston and other scales used in this research were successful in capturing information in the Air Force context. With the exception of the FORMAL scale, the Cronbach's alpha for each scale was better than 0.60. The implication is established models and measures are useful to organizational research on the Air Force.

The influence of strategic decision making on organizational structure. In the literature review, the question of whether strategic decision making influenced organizational structure or the reverse was discussed. During the research, both sets of factors were regressed against the other as both dependent and independent variables. The model where the structural factors were the dependent variables and the strategic decision making factors, the independent variables, was the most successful in accounting for variance. This lends credence to the argument that structure follows strategy.

Factor analysis. Factor analysis proved successful in aggregating the data into usable factors. Although the difference was small, the models using derived factors did account for more variance than did the models using individual variables. The R^2 for the models in this research compared favorably with the variance accounted for in Miller's (Table 29). Factor analysis proved a viable methodology for USAF organizational research.

TABLE 29

VARIANCE ACCOUNTED FOR IN MILLER'S AND THIS RESEARCH

Independent Variable: Strategy Making Factors Dependent Variable: Structure Factor			
Strategy Making Factors	Structural Factor	This Research	Miller
Assertiveness Rationality	Formal Integration	$F = 10.238$ $p = .0001$ $R^2 = .2426$	$F = 7.820$ $p = .001$ $R^2 = .201$

Explicitness of strategy. During factor analysis, based on Miller's model, the variable "explicitness of strategy" was expected to be positively correlated to and load on the rationality factor. Instead, it was negatively correlated and loaded on its own factor. The variable was assessed by a single item in the survey and therefore not testable for internal validity. The question is whether the measure for explicitness of strategy is poor or is explicitness of strategy different in the Air Force context than in the context researched by Miller.

Organizational Findings.

Use of liaison devices and degree of specialization. The research showed USAF logistics organizations use liaison devices to a greater degree than the respondents in Miller's (1987) research. The Air Force also has a higher degree of specialization. Table 27 compares the Air Force means to those in Miller's (1987) research.

Organizational models have been posited that focus on importance of the integrative dimension's liaison devices, e.g. Mintzberg (1989). Follow on research might revisit the relationship between organizational

structure and strategic decision making using a methodology that examines the integrative nature of the organization.

Proactiveness and bargaining. USAF logistics organizations demonstrated a proclivity for proactiveness and bargaining. These two variables had the highest loadings on the factor "assertiveness." This might be a reflection of the Air Force corporate culture where discrimination in ability and performance might be based on initiative and need for "give and take" among organizations, which is contrary to Weber's rational model regarding professional roles.

Closing Remarks

This research began as a study to establish a causal relationship between organizational structure and strategic decision making. Its direction abruptly changed when the initial statistical analysis of the survey data did not establish any connections between these two aspects of organization. The research was refocused on establishing relationships actually did exist. The research adapted Miller's (1987) model, which employed integrative variables tyir strategic decision making and organizational structure together, to an Air Force context to investigate specifically the relationship between organizational structure and strategy making. It should be noted little work on the relationship between organizational structure and strategy has been done on the public sector and the military, in particular. The research used established scales to measure the dimensions of organizational structure and the attributes of organizational decision making. The data was analyzed by factor analysis. The hypotheses were tested using

correlation and multiple regression analyses of the derived factors and original variables.

The results found the measurement scales employed in this study demonstrated good internal validity in capturing the data. Factor analysis provided derived factors that accounted for more variance within the model than did the original variables. The model's hypotheses proved not to be completely successful in their applicability to the Air Force; however, the findings and conclusions do indicate there are connections between structure and decision making.

Follow on research might reexamine the relationship, applying one of the other models postulated. Mintzberg's research (1989) appears to hold significant potential for the further investigation of the strategy and structure relationship in the Air Force.

Why do this type of research? The researcher is firmly convinced it is important to understand the dynamics of the decision making process and its implications on organizational structure. In terms of the major changes that will be implemented in the uncertain future, the Air Force needs to ensure its organizational structure is capable of supporting its decisions.

Appendix A: Strategic Decision Making and Organizational Structure Questionnaire

USAF Survey Control Number SCN 90-49

This questionnaire is part of a Strategic Decision Making and Organizational Structure (SDMOS) Survey being conducted among several USAF major commands and staff agencies. The purpose of the survey is to evaluate the manner in which your organization deals with major policy changes. It does so by assessing the relationship between your command/agency strategic decision making processes and organizational structure. The survey uses the change from the three levels to an alternate maintenance concept as the context for investigating the decision making process. However, the study will not evaluate or judge the success or failure of your organization in choosing or implementing a new logistics strategy to support a change in maintenance concept.

This particular questionnaire is divided into two parts each focusing on the decision making process and organizational structure of your command/agency.

a. Part I will assess the decision making process your organization used or would use in initiating a change from a three-level to an alternate maintenance concept.

b. Part II will focus on the general characteristics of your organization's structure.

Answers should encompass the complete logistics organization of which you are a member. For example, the TAC/LGM should answer the questions based on his knowledge of the TAC/LG deputate. All questions will be phrased in the past tense, presupposing that your command/agency has begun considering the change to the alternate maintenance concept.

Your answers are strictly confidential. The answers you give will be grouped with the answers of other people, and no individual person will ever be identified in any report. After all questionnaires have been analyzed, you will receive feedback on the SDMOS Survey. Hopefully you will find this of some value.

For this survey to be useful, it is important that you answer each question frankly and honestly. There are no hidden meanings behind any questions.

The SDMOS survey was developed and is being conducted by Capt Walter A. Munyer of the School of System and Logistics at the Air Force Institute of Technology and will be used in the fulfillment of degree requirements for the Masters of Science in Logistics Management.

GENERAL INSTRUCTIONS:

Most of the questions ask you to circle one of several numbers that appear on a scale below or beside the item. Corresponding to the end numbers on a scale are brief descriptions representing the two ends of the spectrum of possible answers. You are to circle the one number that most accurately reflects your answer to each question.

For example, if your answer to the following question is "very worthwhile," circle the number "7" on the answer scale:

> Is it worth my time to fill out this questionnaire during the next half hour?

Not worthwhile Very worthwhile

1 2 3 4 5 6 7

The survey will start with introductory questions, beginning on the next page.

A. INTRODUCTORY QUESTIONS

1. Name of the major command or headquarters in which you work:

   1. AFLC
   2. MAC
   3. PACAF
   4. SAC
   5. TAC
   6. USAF
   7. USAFE

2. Level of command in which you work:

   1. USAF or major command headquarters
   2. Numbered Air Force
   3. Air Logistics Center
   4. Wing

3. Name of the directorate/deputate in which you work:

USAF:	1. LE	2. LEY
	3. LET	4. LEX
Major Command/ Numbered Air Force:	1. LG	2. LGM
	3. LGQ	4. LGS
	5. LGT	6. TR
Hq AFLC:	1. MA	2. XP
	3. MM	4. DS
AFLC ALC:	1. MM	2. MA
	3. MMx	
Wing:	1. MA	2. RM

Other: _____ (Please specify)

Part I. These questions pertain to your organization's decision making process in assessing the change from the three levels of maintenance concept to the alternate maintenance concept.

1. In analyzing the change in maintenance concept to what extent did your organization use the following mechanisms?

a. Operations research techniques, such as linear programming and simulation.

Used rarely — Used frequently

1 2 3 4 5 6 7

b. Periodic brainstorming by its senior staff.

Used rarely — Used frequently

1 2 3 4 5 6 7

c. A formalized, systematic search for and evaluation of opportunities to develop new policies and procedures.

Used rarely — Used frequently

1 2 3 4 5 6 7

d. Staff specialists to investigate and write reports on major decisions.

Used rarely — Used frequently

1 2 3 4 5 6 7

2. In executing its planning activities to the change in maintenance concept to what extent did your organization use the following techniques?

a. Long-term forecasting of the operational environment.

Used rarely — Used frequently

1 2 3 4 5 6 7

b. Long-term forecasting of technological advances.

Used rarely — Used frequently

1 2 3 4 5 6 7

c. Long-term forecasting of force structure.

Used rarely — Used frequently

1 2 3 4 5 6 7

3. In meeting the challenges of changing maintenance concept, your organization's planning horizon and future orientation are best described as:

a. Choices among strategic alternatives tend to be made quickly since time pressures are often substantial. — Choices among strategic alternatives tend to be made with great deliberation, thought, and analysis.

1 2 3 4 5 6 7

b. Decisions are aimed at the resolution of crises. — Decisions are aimed at exploiting opportunities.

1 2 3 4 5 6 7

c. Emphasizes

Immediate short-term goals — Medium-term goals — Long-term goals

1 2 3 4 5 6 7

4. In regards to the change in maintenance concept, your organization's strategies can best be described as:

Not having been explicitly conceptualized						Having been precisely conceptualized
1	2	3	4	5	6	7

5. In making a decision on the change in maintenance concept, your organization employed:

Consensus-oriented team decision making						Individual directors'/deputies' decision making
1	2	3	4	5	6	7

6. What value was attached to the interaction between middle and top management in the resolution of problems?

Not very important			Moderately Important			Very important
1	2	3	4	5	6	7

7. In developing strategies for the change in maintenance concept, your organization showed:

a.

A strong tendency to follow others introducing new policies and procedures.						A desire to try to stay ahead of others in trying new policies and procedures.
1	2	3	4	5	6	7

b.

A preference for the tried and true.						A preference for innovation development.
1	2	3	4	5	6	7

c.

An inclination for low-risk projects.						An inclination for high-risk projects.
1	2	3	4	5	6	7

8. Your organization explored changes to maintenance operations caused by the change in maintenance concept:

Gradually and incrementally.						With bold, wide-ranging acts.
1	2	3	4	5	6	7

Part II. These questions assess the general characteristics of your organization's structure.

1. Which level of authority, using the 5 levels identified below, circle the lowest appropriate level in your organization with the authority to make decisions concerning the following:

1 - above the Deputy Chief of Staff
2 - Deputy Chief of Staff
3 - Director/Squadron Commander
4 - Division Chief
5 - Branch Chief

a.	the number of staff required	1	2	3	4	5
b.	whether to employ a staff member	1	2	3	4	5
c.	internal disputes	1	2	3	4	5
d.	overtime for civilian employees	1	2	3	4	5
e.	suspense dates and section priorities	1	2	3	4	5
f.	dismissal of staff member	1	2	3	4	5
g.	methods of staff selection	1	2	3	4	5
h.	allocation of work among the staff	1	2	3	4	5

2. Which of the following documents are used in your command? Circle the most comprehensive answer.

a. Information booklets treating, for example, security, working conditions, command procedures, etc, are given to:

1. No one
2. Only a few persons
3. Many
4. All

b. An organization chart is given to:

1. Deputy Chief of Staff only (or equivalent)
2. Deputy Chief of Staff and directors (or equivalent)
3. All supervisors
4. No one

c. In your organization, are there:

1. written goals?

1. Yes
2. No

2. written manual of procedures and fixed rules?

1. Yes
2. No

3. written operating instructions to staff members?

1. Yes
2. No

3. Of the following activities, is at least one member of your organization's staff charged with the given responsibility?

a. acquires and allocates human resources

1. Yes
2. No

b. develops and trains personnel

1. Yes
2. No

c. takes care of security

1. Yes
2. No

d. obtains and controls materials and equipment

1. Yes
2. No

e. manages capital building, equipment, and resources

1. Yes
2. No

f. records and controls financial resources

1. Yes
2. No

g. controls planning and scheduling

1. Yes
2. No

h. takes care of quality control

1. Yes
2. No

i. devises new outputs, equipment, and processes

1. Yes
2. No

j. develops and executes administrative procedures (statistics, information systems)

1. Yes
2. No

k. deals with legal requirements

1. Yes
2. No

4. To ensure compatibility among decisions, to what extent are the following "integrative mechanisms" used in your organization?

	Used rarely						Used very frequently
a. Interdepartmental committees which are set up to engage in joint decision making.	1	2	3	4	5	6	7
b. Task forces which are temporary bodies set up to facilitate interdepartmental collaboration on a specific project.	1	2	3	4	5	6	7
c. Liaison personnel whose specific job it is to coordinate the efforts of several departments for purposes of a specific project.	1	2	3	4	5	6	7
d. Planning--so that decisions are coordinated via some master plan.	1	2	3	4	5	6	7
e. Bargaining among directorate heads.	1	2	3	4	5	6	7

f. Each department makes decisions more or less on its own without regard to other sections. ... There is a great deal of departmental interaction on most decisions.

1 2 3 4 5 6 7

h. Decisions of the different departments often are not complementary. ... Decisions of the different departments are mutually reinforcing.

1 2 3 4 5 6 7

5. To what extent is decision making at top levels in your organization characterized by participative, cross-functional discussions in which different sections get together to decide the following classes of decisions:

	Rare use of committees or infrequent informal collaboration				Frequent use of committees or informal interdepartmental collaboration		
a. Decisions concerning operational strategies.	1	2	3	4	5	6	7
b. Long-term strategies and decisions related to changes in the command's operating philosophy.	1	2	3	4	5	6	7

6. Rate the extent to which the following control devices are used to gather information about the performance of your organization.

	Used rarely or small part the org.				Used frequently or throughout the org.		
a. A comprehensive management control and information system.	1	2	3	4	5	6	7
b. Use of cost centers for cost control.	1	2	3	4	5	6	7
c. Use of a goal program.	1	2	3	4	5	6	7
d. Quality control of operations by using sampling and other techniques.	1	2	3	4	5	6	7

7. How many levels are there in the organization? For example, what is the number of levels in the longest line between a staff member and the LG?

1. One
2. Two
3. Three
4. Four
5. Five
6. Six
7. Seven or more

Thank-you for completing this survey. Please return in the enclosed envelope.

MEASUREMENT SCALE-TO-QUESTION CROSS REFERENCE

Measurement Scale	Nomenclature	Survey Part Number	Questions
Analysis	ANALY	I	1a - 1d
Future Orientation/ Planning	FUTURE	I	2a - 2c 3a - 3c
Explicitness of Strategy	EXPLICIT	I	4
Consensus vs Individual Decision Making	CONSENS	I	5
Bargaining	BARGAIN	I	6
Proactiveness	PROACT	I	7a - 7c
Risk Taking	RISK	I	8
Centralization	CENT	II	1a - 1h
Formalization	FORMAL	II	2a - 2c
Specialization	SPEC	II	3a - 3k
Liaison Structures	LIASTRUC	II	4a - 4c 5a - 5b
Liaison Processes	LIASDMG	II	5d - 5h
Control	CONTRCL	II	6a - 6d

Appendix B: Descriptive Statistics Summaries of Variables

Univariate Procedure

Variable=ANALY

Moments

N	68	Sum Wgts	68
Mean	3.944853	Sum	268.25
Std Dev	1.232221	Variance	1.518369
Skewness	-0.5593	Kurtosis	-0.00563
USS	1159.938	CSS	101.7307
CV	31.23617	Std Mean	0.149429
T:Mean=0	26.39956	Prob>|T|	0.0001
Num ^= 0	68	Num > 0	68
M(Sign)	34	Prob>|M|	0.0001
Sgn Rank	1173	Prob>|S|	0.0001
W:Normal	0.948979	Prob<W	0.0166

Quantiles(Def=5)

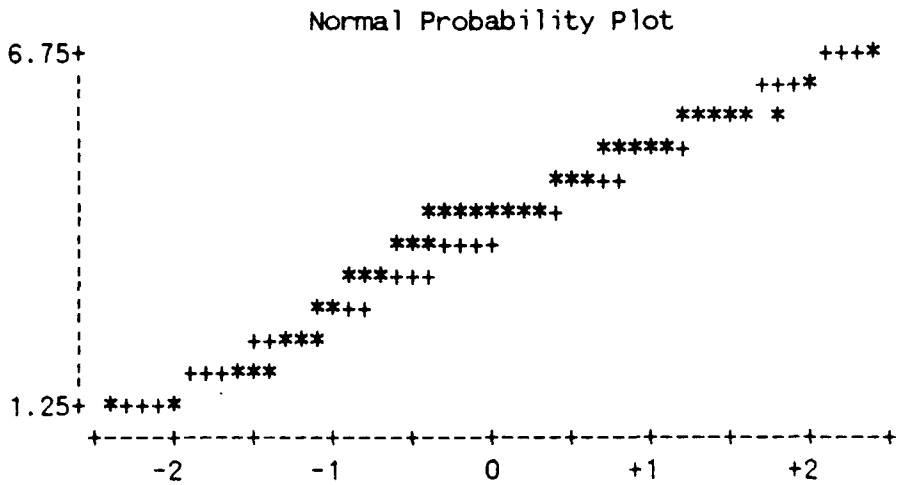
100% Max	6.5	99%	6.5
75% Q3	4.75	95%	5.5
50% Med	4	90%	5.5
25% Q1	3.25	10%	2
0% Min	1	5%	1.5
		1%	1
Range	5.5		
Q3-Q1	1.5		
Mode	4		

Extremes

Lowest	Obs	Highest	Obs
1(	26)	5.5(	45)
1.25(	48)	5.5(	58)
1.25(	20)	5.75(	18)
1.5(	55)	6(	32)
1.5(	39)	6.5(	6)

Variable=ANALY

```
Stem Leaf                    #        Boxplot
   6 5                       1           |
   6 0                       1           |
   5 555558                  6           |
   5 00002222                8           |
   4 55555888                8        +-----+
   4 00000000000002222222    20       *-----*
   3 555888                  6        |  +  |
   3 000222                  6        +-----+
   2 588                     3           |
   2 002                     3           |
   1 558                     3           |
   1 022                     3           |
     ----+----+----+----+
```



Univariate Procedure

Variable=FUTURE

Moments

N	68	Sum Wgts	68
Mean	4.029412	Sum	274
Std Dev	1.302486	Variance	1.696469
Skewness	-0.41449	Kurtosis	-0.69805
USS	1217.722	CSS	113.6634
CV	32.32446	Std Mean	0.15795
T:Mean=0	25.51075	Prob>|T|	0.0001
Num ^= 0	68	Num > 0	68
M(Sign)	34	Prob>|M|	0.0001
Sgn Rank	1173	Prob>|S|	0.0001
W:Normal	0.939446	Prob<W	0.0040

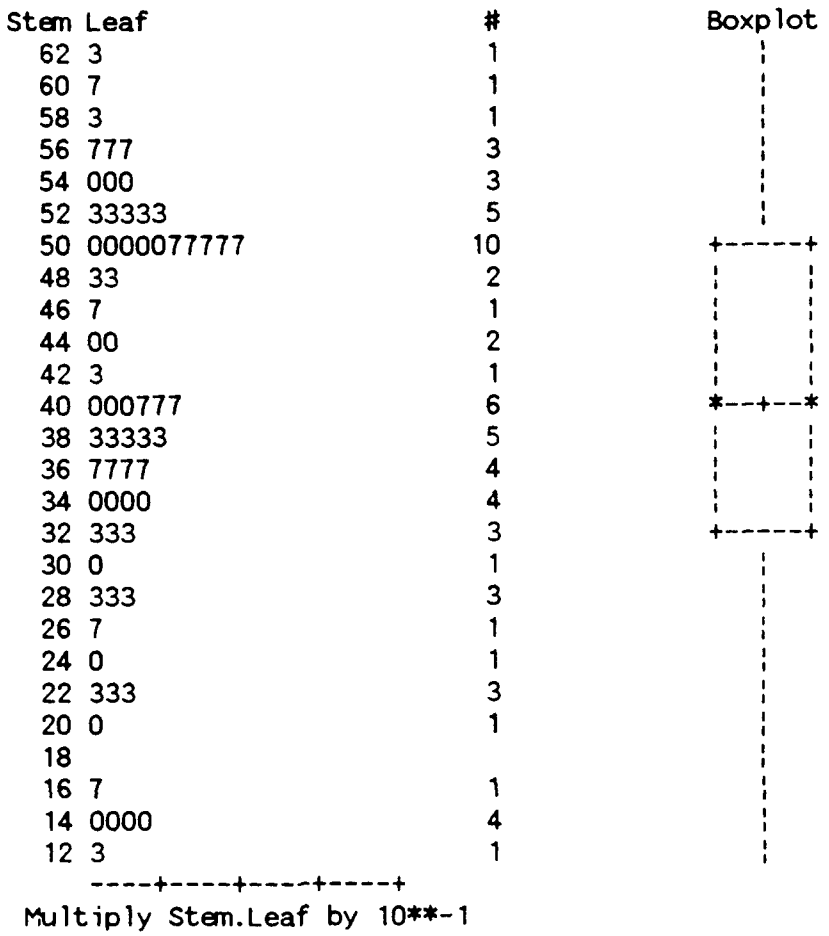
Quantiles(Def=5)

100% Max	6.333333	99%	6.333333
75% Q3	5.166667	95%	5.666667
50% Med	4	90%	5.5
25% Q1	3.333333	10%	2
0% Min	1.333333	5%	1.5
		1%	1.333333
Range	5		
Q3-Q1	1.833333		
Mode	3.833333		

Extremes

Lowest	Obs	Highest	Obs
1.333333(	48)	5.666667(	21)
1.5(	59)	5.666667(	42)
1.5(	46)	5.833333(	31)
1.5(	26)	6.166667(	67)
1.5(	15)	6.333333(	18)

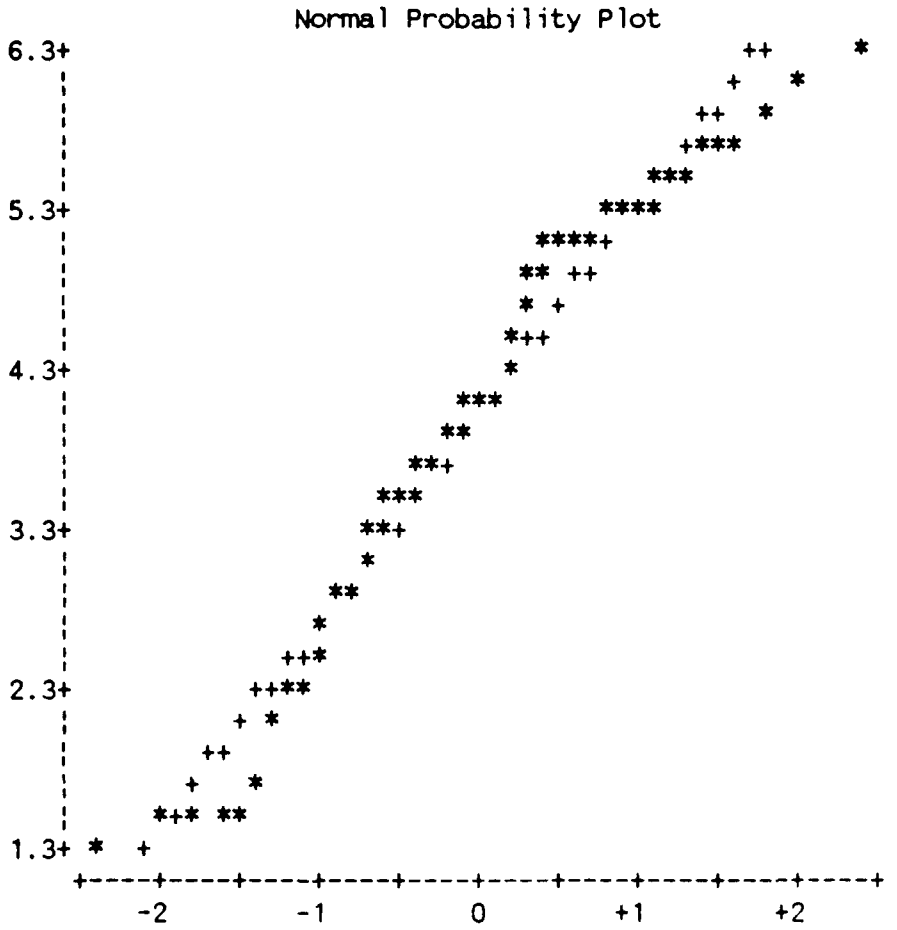
Variable=FUTURE



Stem	Leaf	#	Boxplot
62	3	1	
60	7	1	
58	3	1	
56	777	3	
54	000	3	
52	33333	5	
50	0000077777	10	+-----+
48	33	2	| |
46	7	1	| |
44	00	2	| |
42	3	1	| |
40	000777	6	*--+--*
38	33333	5	| |
36	7777	4	| |
34	0000	4	| |
32	333	3	+-----+
30	0	1	
28	333	3	
26	7	1	
24	0	1	
22	333	3	
20	0	1	
18			
16	7	1	
14	0000	4	
12	3	1	

Multiply Stem.Leaf by 10**-1

Variable=FUTURE



Univariate Procedure

Variable=EXPLIC

Moments

N	68	Sum Wgts	68
Mean	4.720588	Sum	321
Std Dev	3.708987	Variance	13.75658
Skewness	6.03228	Kurtosis	44.72776
USS	2437	CSS	921.6912
CV	78.57044	Std Mean	0.449781
T:Mean=0	10.49531	Prob>|T|	0.0001
Num ^= 0	68	Num > 0	68
M(Sign)	34	Prob>|M|	0.0001
Sgn Rank	1173	Prob>|S|	0.0001
W:Normal	0.491704	Prob<W	0.0001

Quantiles(Def=5)

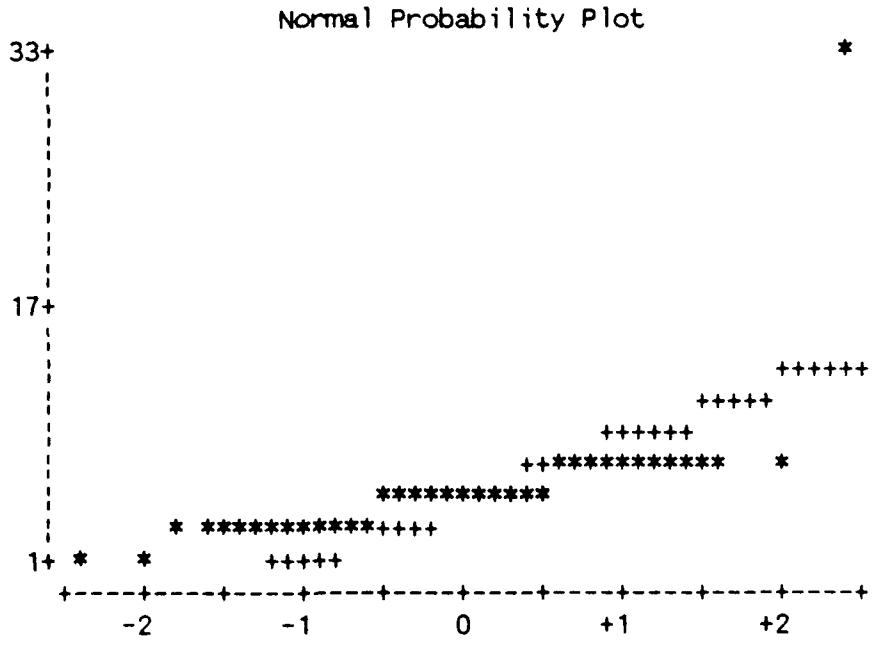
100% Max	32	99%	32
75% Q3	6	95%	7
50% Med	5	90%	6
25% Q1	3	10%	2
0% Min	1	5%	2
		1%	1
Range	31		
Q3-Q1	3		
Mode	6		

Extremes

Lowest	Obs	Highest	Obs
1(	43)	6(	67)
1(	19)	7(	21)
2(	56)	7(	57)
2(	55)	7(	58)
2(	48)	32(	34)

Variable=EXPLIC

Stem	Leaf	#	Boxplot
32	0	1	*
30			
28			
26			
24			
22			
20			
18			
16			
14			
12			
10			
8			
6	0000000000000000000	19	+-----+
4	0000000000000000000000000000	27	*--+--*
2	0000000000000000000	19	+-----+
0	00	2	¦



Univariate Procedure

Variable=CONCENS

Moments

N	68	Sum Wgts	68
Mean	4.147059	Sum	282
Std Dev	1.789394	Variance	3.201932
Skewness	-0.05062	Kurtosis	-0.81576
USS	1384	CSS	214.5294
CV	43.14851	Std Mean	0.216996
T:Mean=0	19.11123	Prob>|T|	0.0001
Num ^= 0	68	Num > 0	68
M(Sign)	34	Prob>|M|	0.0001
Sgn Rank	1173	Prob>|S|	0.0001
W:Normal	0.921214	Prob<W	0.0002

Quantiles(Def=5)

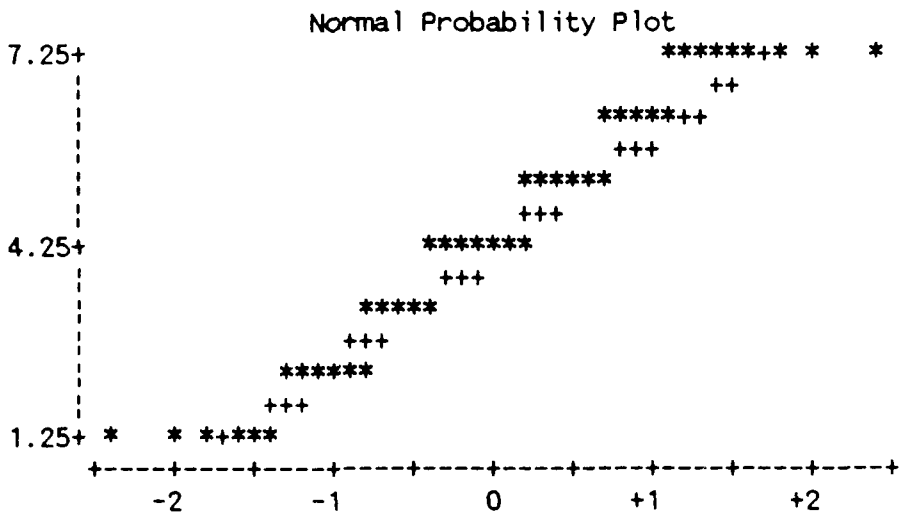
100% Max	7	99%	7
75% Q3	5	95%	7
50% Med	4	90%	7
25% Q1	3	10%	2
0% Min	1	5%	1
		1%	1
Range	6		
Q3-Q1	2		
Mode	4		

Extremes

Lowest	Obs	Highest	Obs
1(	60)	7(	25)
1(	58)	7(	26)
1(	52)	7(	42)
1(	38)	7(	48)
1(	17)	7(	57)

Variable=CONCENS

Stem	Leaf	#	Boxplot
7	000000000	9	
6			
6	0000000	7	
5			
5	000000000000	12	+------+
4			| |
4	00000000000000000	17	*--+--*
3			| |
3	000000000	9	+------+
2			
2	00000000	8	
1			
1	000000	6	



Univariate Procedure

Variable=BARGAIN

Moments

N	68	Sum Wgts	68
Mean	5.294118	Sum	360
Std Dev	1.648689	Variance	2.718174
Skewness	-1.0446	Kurtosis	0.482265
USS	2088	CSS	182.1176
CV	31.14189	Std Mean	0.199933
T:Mean=0	26.47948	Prob>|T|	0.0001
Num ^= 0	68	Num > 0	68
M(Sign)	34	Prob>|M|	0.0001
Sgn Rank	1173	Prob>|S|	0.0001
W:Normal	0.847038	Prob<W	0.0001

Quantiles(Def=5)

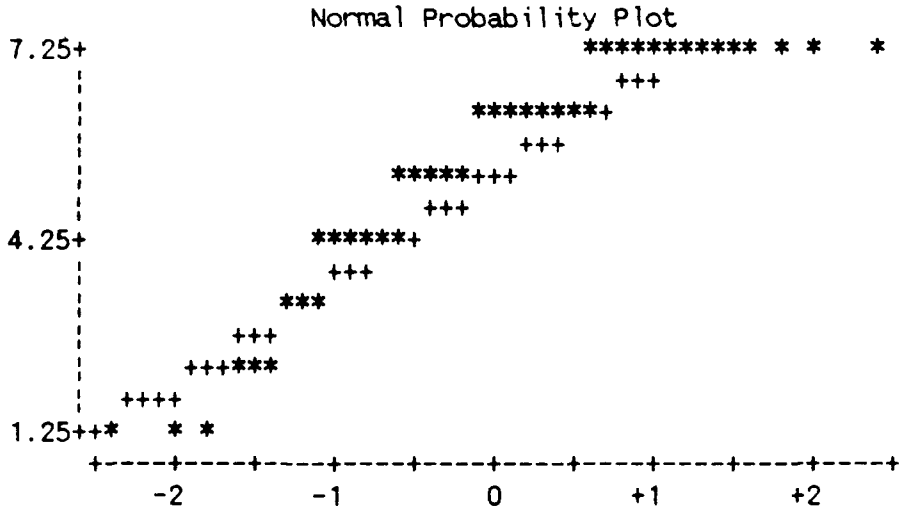
100% Max	7	99%	7
75% Q3	7	95%	7
50% Med	6	90%	7
25% Q1	4	10%	3
0% Min	1	5%	2
		1%	1
Range	6		
Q3-Q1	3		
Mode	6		

Extremes

Lowest	Obs	Highest	Obs
1(	61)	7(	57)
1(	48)	7(	59)
1(	14)	7(	64)
2(	46)	7(	65)
2(	44)	7(	67)

Variable=BARGAIN

```
Stem Leaf                    #          Boxplot
   7 000000000000000000     18          +------+
   6                                     |      |
   6 00000000000000000000   20          *------*
   5                                     |      |
   5 000000000000           12          |  +   |
   4                                     |      |
   4 000000000               9          +------+
   3                                        |
   3 000                     3              |
   2                                        |
   2 000                     3              |
   1                                        |
   1 000                     3              |
     ----+----+----+----+
```



Univariate Procedure

Variable=PROACT

Moments

N	68	Sum Wgts	68
Mean	4.205882	Sum	286
Std Dev	1.292958	Variance	1.671739
Skewness	-0.61023	Kurtosis	-0.05089
USS	1314.889	CSS	112.0065
CV	30.74165	Std Mean	0.156794
T:Mean=0	26.82423	Prob>|T|	0.0001
Num ^= 0	68	Num > 0	68
M(Sign)	34	Prob>|M|	0.0001
Sgn Rank	1173	Prob>|S|	0.0001
W:Normal	0.947441	Prob<W	0.0133

Quantiles(Def=5)

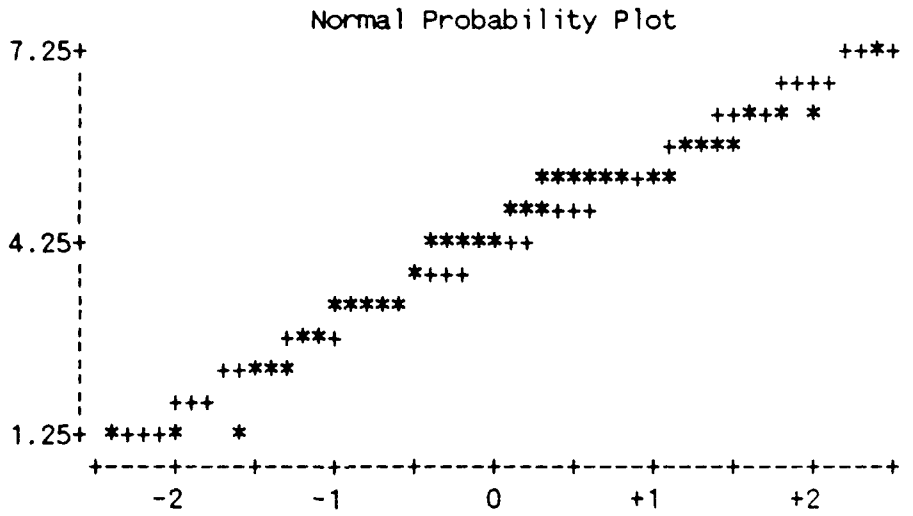
100% Max	7	99%	7
75% Q3	5.166667	95%	6
50% Med	4.333333	90%	5.666667
25% Q1	3.333333	10%	2.333333
0% Min	1	5%	1.333333
		1%	1
Range	6		
Q3-Q1	1.833333		
Mode	5		

Extremes

Lowest	Obs	Highest	Obs
1(	44)	5.666667(	54)
1.333333(	61)	6(	13)
1.333333(	49)	6(	20)
1.333333(	26)	6(	56)
2(	48)	7(	57)

Variable=PROACT

Stem	Leaf	#	Boxplot
7	0	1	
6			
6	000	3	
5	7777	4	
5	000000000333333333	18	+-----+
4	7777777	7	| |
4	0000003333333	13	*--+--*
3	77	2	| |
3	0000033333	10	+-----+
2	777	3	
2	003	3	
1			
1	0333	4	



Univariate Procedure

Variable=RISK

Moments

N	68	Sum Wgts	68
Mean	3.632353	Sum	247
Std Dev	1.444541	Variance	2.086699
Skewness	-0.1807	Kurtosis	-0.86624
USS	1037	CSS	139.8088
CV	39.76874	Std Mean	0.175176
T:Mean=0	20.73541	Prob>|T|	0.0001
Num ^= 0	68	Num > 0	68
M(Sign)	34	Prob>|M|	0.0001
Sgn Rank	1173	Prob>|S|	0.0001
W:Normal	0.914178	Prob<W	0.0001

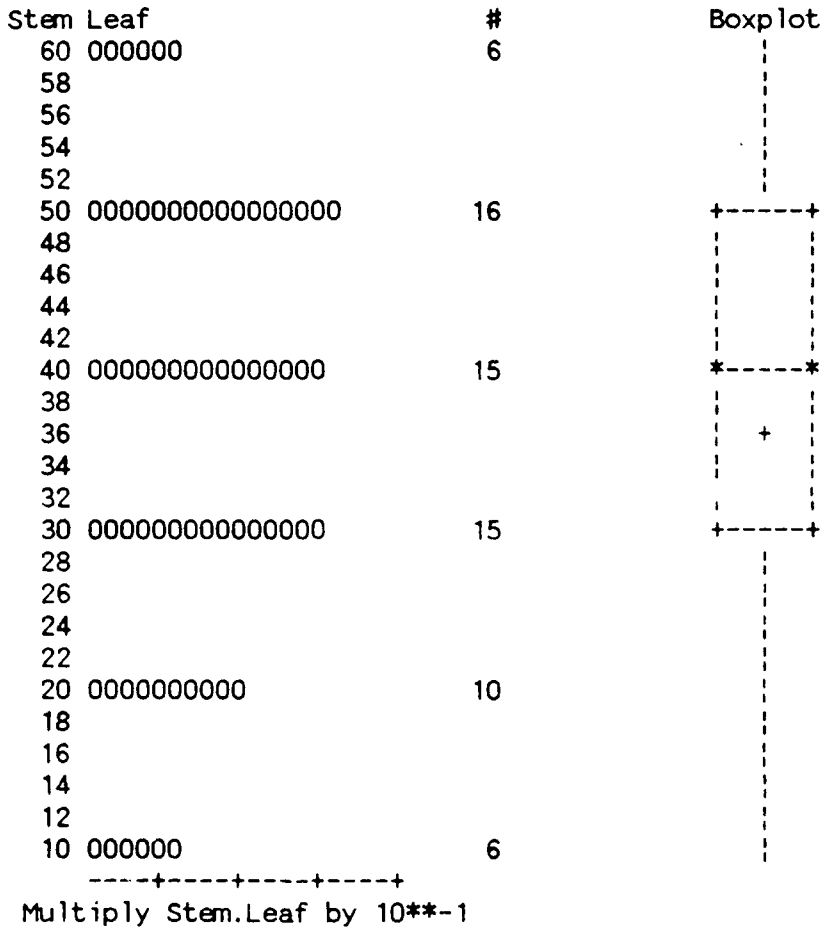
Quantiles(Def=5)

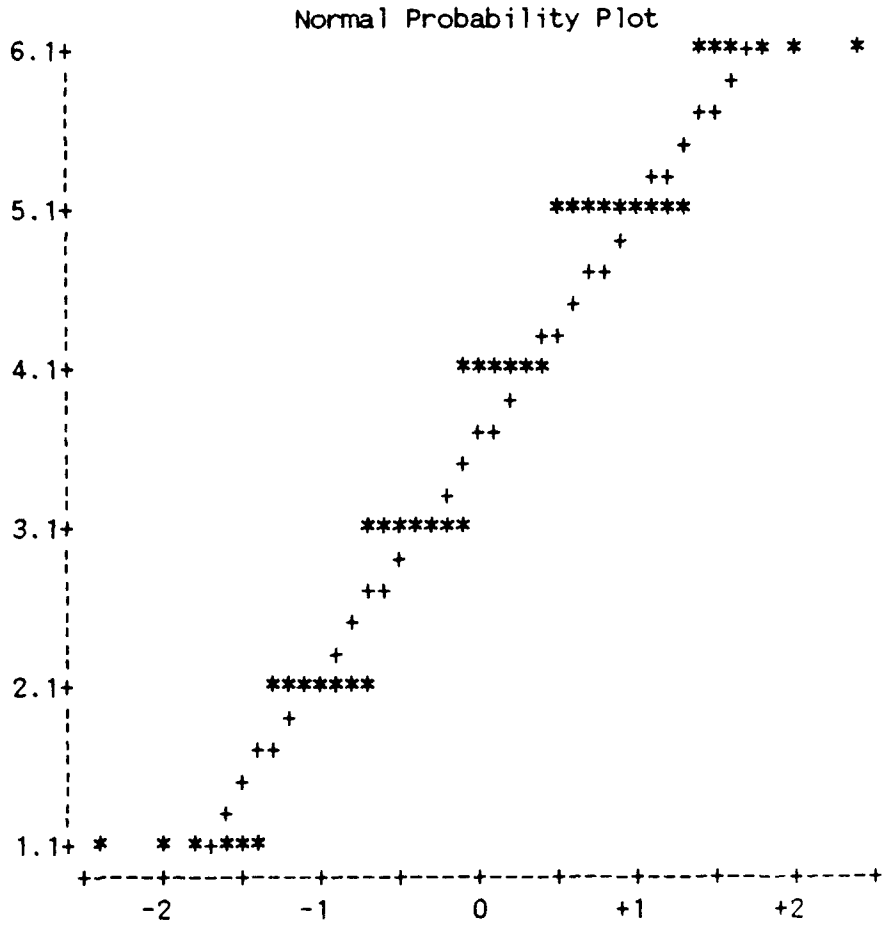
100% Max	6	99%	6
75% Q3	5	95%	6
50% Med	4	90%	5
25% Q1	3	10%	2
0% Min	1	5%	1
		1%	1
Range	5		
Q3-Q1	2		
Mode	5		

Extremes

Lowest	Obs	Highest	Obs
1(	61)	6(	33)
1(	57)	6(	48)
1(	49)	6(	54)
1(	43)	6(	56)
1(	26)	6(	64)

Variable=RISK




Normal Probability Plot
6.1+
5.1+
4.1+
3.1+
2.1+
1.1+
-2
-1
0
+1
+2

Univariate Procedure

Variable=CENT

Moments

N	68	Sum Wgts	68
Mean	3.503676	Sum	238.25
Std Dev	0.615021	Variance	0.378251
Skewness	-0.14061	Kurtosis	-0.59705
USS	860.0938	CSS	25.34283
CV	17.5536	Std Mean	0.074582
T:Mean=0	46.97733	Prob>|T|	0.0001
Num ^= 0	68	Num > 0	68
M(Sign)	34	Prob>|M|	0.0001
Sgn Rank	1173	Prob>|S|	0.0001
W:Normal	0.971361	Prob<W	0.2987

Quantiles(Def=5)

100% Max	4.75	99%	4.75
75% Q3	4	95%	4.5
50% Med	3.5	90%	4.25
25% Q1	3.125	10%	2.625
0% Min	2.125	5%	2.5
		1%	2.125
Range	2.625		
Q3-Q1	0.875		
Mode	3.125		

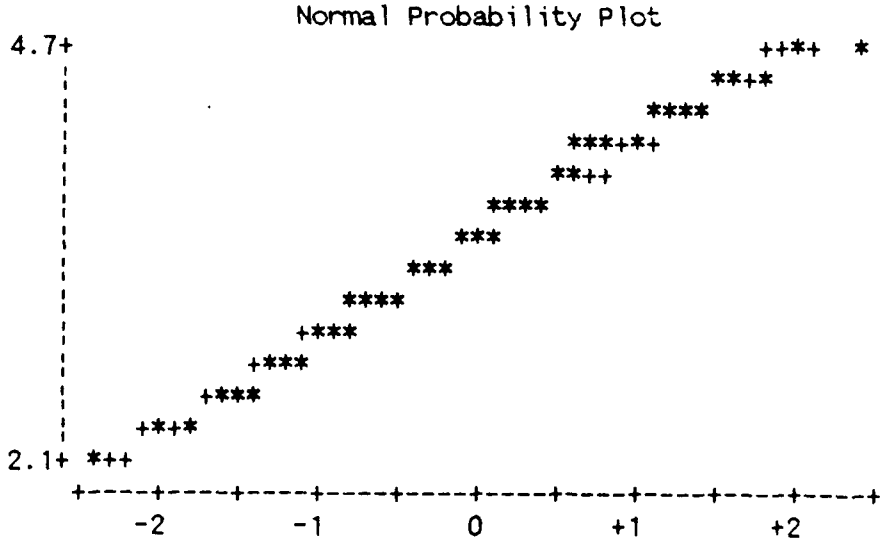
Extremes

Lowest	Obs	Highest	Obs
2.125(	26)	4.5(	2)
2.375(	32)	4.5(	43)
2.375(	30)	4.5(	53)
2.5(	39)	4.625(	68)
2.5(	35)	4.75(	48)

Variable=CENT

Stem	Leaf	#	Boxplot
46	25	2	
44	000	3	
42	5558	4	
40	0000022222	10	+-----+
38	888	3	| |
36	222225555	9	| |
34	0000000	7	*--+--*
32	58888888	8	| |
30	22222222	8	+-----+
28	888	3	|
26	22555	5	|
24	000	3	|
22	88	2	|
20	2	1	|

Multiply Stem.Leaf by 10**-1



Univariate Procedure

Variable=LIASDEV

Moments

N	67	Sum Wgts	67
Mean	10.04403	Sum	672.95
Std Dev	1.764196	Variance	3.112388
Skewness	-0.12761	Kurtosis	-0.06648
USS	6964.548	CSS	205.4176
CV	17.56462	Std Mean	0.215531
T:Mean=0	46.60135	Prob>|T|	0.0001
Num ^= 0	67	Num > 0	67
M(Sign)	33.5	Prob>|M|	0.0001
Sgn Rank	1139	Prob>|S|	0.0001
W:Normal	0.986154	Prob<W	0.8848

Quantiles(Def=5)

100% Max	14	99%	14
75% Q3	11.25	95%	13.1
50% Med	10.25	90%	12.1
25% Q1	8.85	10%	7.8
0% Min	5.65	5%	6.9
		1%	5.65
Range	8.35		
Q3-Q1	2.4		
Mode	10.25		

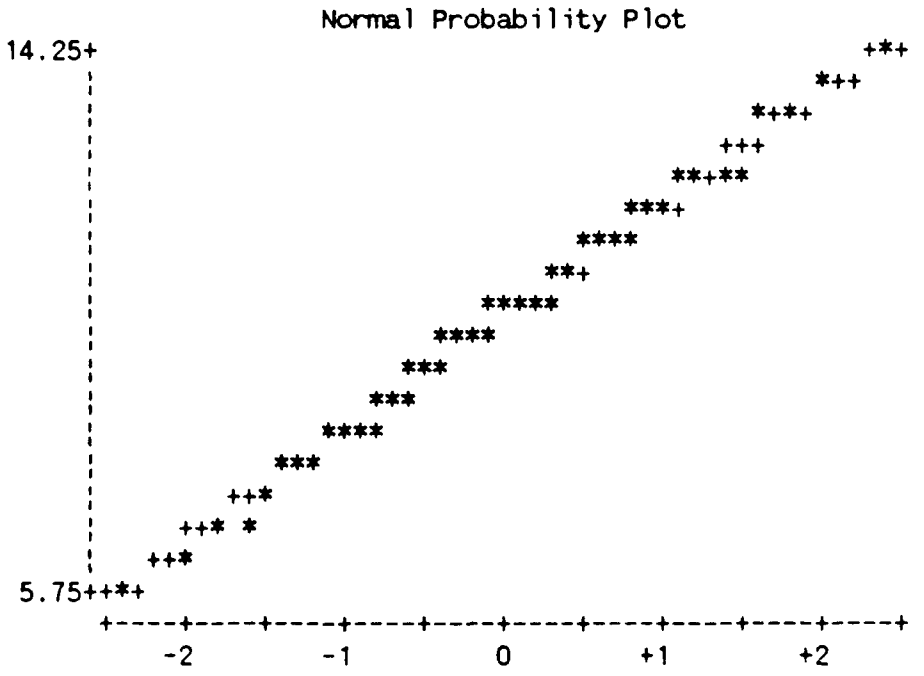
Extremes

Lowest	Obs	Highest	Obs
5.65(	26)	12.45(	57)
6.35(	40)	13.1(	58)
6.8(	25)	13.3(	64)
6.9(	1)	13.75(	38)
7(	24)	14(	3)

Missing Value	.
Count	1
% Count/Nobs	1.47

Variable=LIASDEV

Stem	Leaf	#	Boxplot
14	0	1	
13	8	1	
13	13	2	
12			
12	001124	6	
11	5668	4	
11	0000001244	10	+------+
10	6	1	| |
10	02222344444	11	*--+--*
9	55667788	8	| |
9	022344	6	| |
8	588	3	+------+
8	0023444	7	
7	78	2	
7	0	1	
6	89	2	
6	4	1	
5	6	1	



Univariate Procedure

Variable=SPEC

Moments

N	68	Sum Wgts	68
Mean	9.411765	Sum	640
Std Dev	1.805756	Variance	3.260755
Skewness	-1.23954	Kurtosis	0.833435
USS	6242	CSS	218.4706
CV	19.18616	Std Mean	0.21898
T:Mean=0	42.98	Prob>|T|	0.0001
Num ^= 0	68	Num > 0	68
M(Sign)	34	Prob>|M|	0.0001
Sgn Rank	1173	Prob>|S|	0.0001
W:Normal	0.809446	Prob<W	0.0001

Quantiles(Def=5)

100% Max	11	99%	11
75% Q3	11	95%	11
50% Med	10	90%	11
25% Q1	8	10%	7
0% Min	4	5%	5
		1%	4
Range	7		
Q3-Q1	3		
Mode	11		

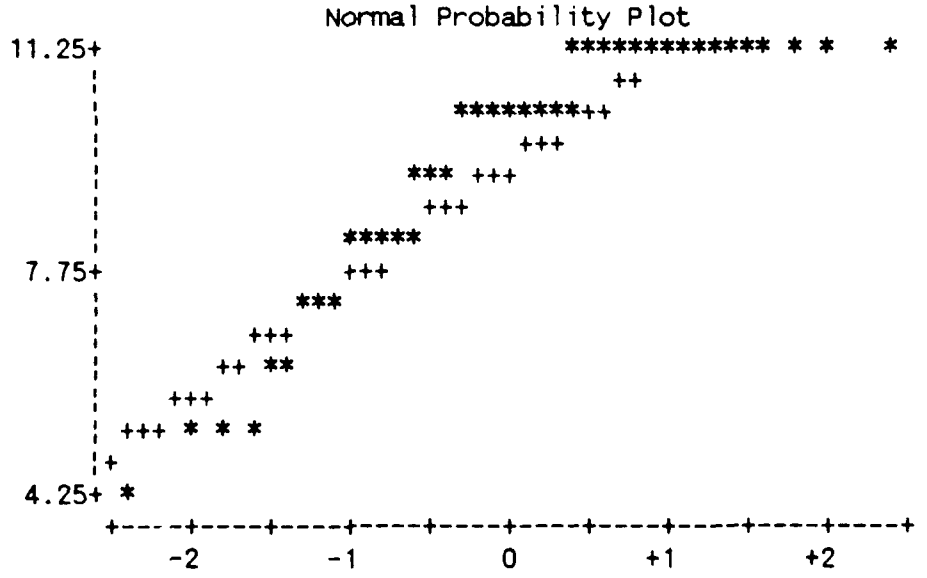
Extremes

Lowest	Obs	Highest	Obs
4(	57)	11(	63)
5(	40)	11(	64)
5(	31)	11(	65)
5(	15)	11(	67)
6(	49)	11(	68)

Univariate Procedure

Variable=SPEC

Stem	Leaf	#	Boxplot
11	000000000000000000000000	24	+-----+
10			¦ ¦
10	000000000000000000	19	*-----*
9			¦ ¦
9	0000000	7	¦ + ¦
8			¦ ¦
8	00000000	8	+-----+
7			¦
7	0000	4	¦
6			¦
6	00	2	¦
5			¦
5	000	3	¦
4			¦
4	0	1	¦



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Vita

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13. ABSTRACT *(Maximum 200 words)*

This research investigated the relationship between the organizational structure and strategic decision making process of major USAF logistics organizations. The change in aircraft maintenance concept was the context for the investigation. The research methodology was based on a model in the literature. Data collection was done using a mail survey to senior USAF logisticians. The survey data was analyzed using factor analysis. The data formed on two structure factors--centralization and formal integration--an two decision making factors--rationality and assertiveness. The factors and variables were tested in correlation and regression analyses. The models that best explained the variance were used to test the hypotheses. The results indicated structure and decision making are related. The structural dimensions of formalization and integration correlated with the decision making attributes of rationality and assertiveness. The centralization dimension appeared to be influenced by external factors. USAF logistics organizations were shown to use liaison devices to a greater extent the the respondents in the base model. Air Force logistics organizations also tend to take a proactive stance and use bargaining in its decision making.

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